



Crawley Transport Model

Highway Assignment Model

Local Model Forecasting Report

On behalf of **West Sussex County Council**

Project Ref: 35981/R03 | Rev: AA | Date: October 2016

Office Address: Caversham Bridge House, Waterman Place, Reading, Berkshire RG1 8DN
T: +44 (0)118 950 0761 F: +44 (0)118 959 7498 E: reading@peterbrett.com



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	Name	Position	Signature	Date
Prepared by:	Norbert Moyo	Principal		16/10/2016
Reviewed by:	Paul Gebbett	Associate		18/10/2016
Approved by:	Sarah Matthews	Equity Director		19/10/2016
For and on behalf of Peter Brett Associates LLP				

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1 Introduction

1.1 Background

1.1.1 Peter Brett Associates LLP (PBA) was commissioned by West Sussex County Council (WSCC) to update the Crawley Transport Model (CTM). This report summarises the methodology which has been adopted in order to develop future forecast years 2021 and 2030 Reference Case Models using a validated base year 2015 SATURN model of Crawley. The purpose of this model is to assist in assessing the relative effects of different transport schemes to alleviate transport issues in and around Crawley.

1.1.2 The aim of the project is to develop a traffic model with a base year of 2015 that will be used to test the relative effects of transport infrastructure schemes and development proposals within the Crawley area. The immediate need for the CTM is to support a local growth fund bid to the Coast to Capital Local Enterprise Partnership (CtC LEP) for the Crawley Area Transport Package Phase Two schemes, which are included in the Strategic Infrastructure Package, Infrastructure Delivery Plan and Crawley Town Centre feasibility study.

1.2 Model Area

1.2.1 The area covered by the model is shown in Figure 1-1. The model includes the whole of the Crawley urban area and Gatwick Airport, which has been included to enable local access improvements to be assessed at the airport.

1.2.2 The CTM is a highway network model developed using the SATURN software. The model consists of an AM peak hour model (08:00 to 09:00), an average Inter Peak hour model (10:00 to 16:00) and a PM peak hour model (17:00 to 18:00). The model consists of five user classes comprising car commute, car employer business, car other, Light Goods Vehicles (LGV) and Heavy Goods Vehicles.

1.2.3 The base year model development, calibration and validation is reported in '35981-R002 Crawley Transport Model – LMVR', PBA, August 2016.

1.3 Spreadsheet Demand Model

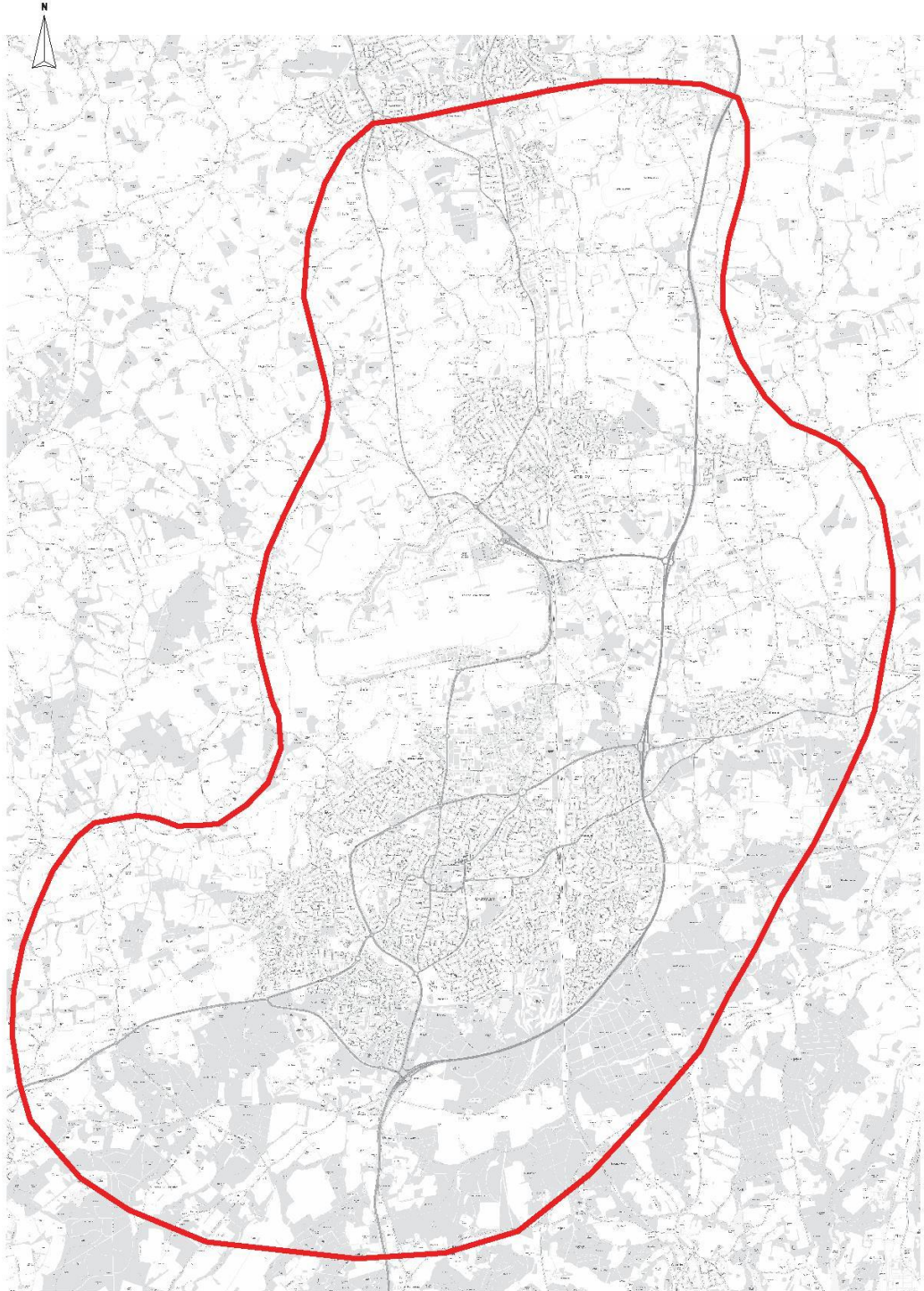
1.3.1 The SATURN model is a highway assignment model, however it is recognised that modelling of specific interventions may need to assess mode share relative to public transport (PT) and active modes. To address these considerations, the SATURN traffic assignment model is supported by a spreadsheet-based trip end and mode choice model called the Crawley Transport Model Forecasting Tool (CTFT).

1.3.2 The spreadsheet model will enable the preparation of consistent scenario forecasts and will include committed development information, data taken from local plans, along with growth predictions from Department for Transport (DfT) National Trip End Model (NTEM).

1.3.3 At this stage other demand responses, such as time period choice are not considered, but the approach taken to develop the model allows flexibility for this to be considered at a later stage with the addition of DIADEM or similar.

1.3.4 The development of the CTFT is reported as Appendix A.

Figure 1-1: Crawley Transport Model – Study Area



1.1 Local Context

1.1.1 Crawley is located in the north of the County of West Sussex, bordering Surrey just to the north of the town. Crawley is bounded by the M23 to the east and south, which links to the M25 approximately 10 miles north. To the south of Crawley, the M23 becomes the A23 to Brighton and the south coast. Gatwick Airport is located directly to the north of Crawley.

- 1.1.2 The M23 accommodates strategic traffic movements, which bypass Crawley and also allows access to/from Crawley and Gatwick Airport via four junctions.
- 1.1.3 There are a number of A-Roads which provide connections to the local area. These include the A217 which links Crawley to Reigate in the north and the A264 which provide a link to East Grinstead, and Copthorne to the east, and Horsham to the south west. Areas to the south east and west/north west of Crawley are more rural in character, with B roads and minor roads from local villages such as Rusper, Charlwood and Balcombe.
- 1.1.4 Within Crawley itself, Crawley Avenue forms an inner ring road to the north and west, which is crossed by a number of arterial roads allowing access to the town centre. Manor Royal is a major employment area within Crawley covering an area of 240 hectares and home to approximately 500 businesses generating 30,000 jobs¹. This is located to the north of Crawley Avenue and south of Gatwick Airport.
- 1.1.5 There are some unique challenges/characteristics inherent in the Crawley network, not least the impact of Gatwick Airport as was recognised and documented in the validation report. This includes:
- Parking choices for the general public and employees at Gatwick, which may influence route choice for example between Gatwick Road and London Road.
 - The nature of day to day variability of route choice such as between the A264 Horsham Road, A2220 Horsham Road and A23 Brighton Road to access the town centre from the west and south. Access to the Crawley from the west and south east is also characterised by the more minor routes such as Ifield Drive, Rusper Road, Turners Hill and Balcombe Road.
 - The rail level crossings and shuttle working under rail bridges (St Marys' Drive), the influence of signalised junctions in corridors such as Haslett Avenue/Worth Park Avenue all of which influence day to day basis variations in journey times and hence route choice.
 - Given the proximity of Gatwick Airport and the importance that the Highways England (HE) network, namely the A23 Trunk Road and in particular the M23 plays in enabling long distance traffic to bypass Crawley to access and egress Gatwick Airport, considerable effort has been made to calibrate flows and journey times on the M23 including the M23 Gatwick spur at M23 Junction 9. Locally, emphasis has been placed in calibrating and validating key areas of future proposed development in Crawley including Manor Royal employment area, North East sector development area, Copthorne area development east of M23 Junction 10 and that access to the town centre from the south is well represented.

1.2 Future Model Applications

- 1.2.1 When considering the use of the CTM for future work the following should be considered.
- 1.2.2 Although it is desirable for the models to reflect the day to day variations, in practice models are tools with limited ability to capture all the intricate sensitivities inherent in a network like Crawley. The model represents average weekday conditions, and therefore it is not possible to replicate the day to day variability and sensitivities accurately. The model has been created to consider the availability of route choices, even though it may not be possible to match in every case, actual flows and journey times for specific competing routes. The base year model has therefore validated to replicate directional cordon and screen line flows as priority over

¹ http://manorroyal.org/pages/index.cfm?page_id=5

individual link flows for example. The stability of the model is demonstrated through achieving acceptable convergence criteria demonstrating its robustness.

- 1.2.3 In considering the compliance of the CTM with WebTAG validation criteria and guidelines, it is important to understand the purpose for which the model is required. Guidance notes on validation acceptability are provided in TAG Unit M3.1. As stated in the guidance, this does not guarantee that a model is 'fit for purpose' and likewise a failure to meet the specified validation standards does not mean that a model is not 'fit for purpose'. A model that meets the specified validation standards may not be fit for the particular purposes and conversely, a model that fails to meet to some degree the validation standards maybe useable for certain applications. On this basis, the validation of the CTM prioritises areas of the network at which interventions and development are proposed. The use of matrix estimation has been minimised in favour of refining the prior matrices in an effort to meet calibration and validation standards. Please note that the model has been created to test schemes that are currently known and may not be robust for the purpose of testing all future schemes. The model may need to be updated and therefore it is recommended that the model is reviewed/audited before testing each scheme and/or development proposal.

1.3 Report Structure

- 1.3.1 This report details the methodology used to create the 2021 and 2030 Reference Year forecasts. For ease of reporting, the term "do-minimum" (DM) is used in the report, in reference to these highways forecast models. Following this section, the report is split into the following sections:
- Section 2 provides an outline of the forecast methodology;
 - Section 3 outlines the future development and future highway infrastructure schemes;
 - Section 4 provides an analysis of future year forecast assignment results.

2 Forecast Methodology

2.1 Overview

2.1.1 Forecast models have been developed for the future years of 2021 and 2030 as specified in the commission of the Crawley Transport Model (CTM). The forecast methodology has followed guidance contained in the Department for Transport (DfT) WebTAG Unit M4 - Forecasting and Uncertainty. This has necessitated the development of an uncertainty log to inform development and infrastructure that has a reasonable likelihood of being implemented by the modelled forecast years. The uncertainty log was compiled using information provided by West Sussex County Council (WSSCC) as client and highway authority, and by Crawley Borough Council (CBC) as the local planning authority.

2.2 Forecasting Approach and Forecasting Tool

2.2.1 The Crawley Transport Forecasting Tool (CTFT) is a bespoke spreadsheet based tool that has been developed by PBA to inform the forecast process.

2.2.2 The tool has been created alongside the CTM to forecast demand and estimate traffic demand responses to changes in the modelled highway network and also has high-level representations of public transport and active model interventions.

2.2.3 Further details about the CTFT can be found in the technical note included in Appendix A. A technical user guide on how to use the CTFT is provided as a separate document.

2.2.4 The CTFT is comprised of three Excel spreadsheet modules that interact with the SATURN highway model. The modules and their functions are:

- Module A – Land use and growth data
- Module B – Public Transport and Active Modes data
- Module C – Demand adjustment and control worksheet

2.2.5 Figure 2-1 gives a visual representation of how the modules interact with each other and with the SATURN model.

2.2.6 The CTFT is designed so that the information regarding file locations is entered into Module C. The control worksheet in Module C is then used to run the model. The code underlying Module C will automatically copy the relevant data from the other modules and undertake specified SATURN model assignment(s).

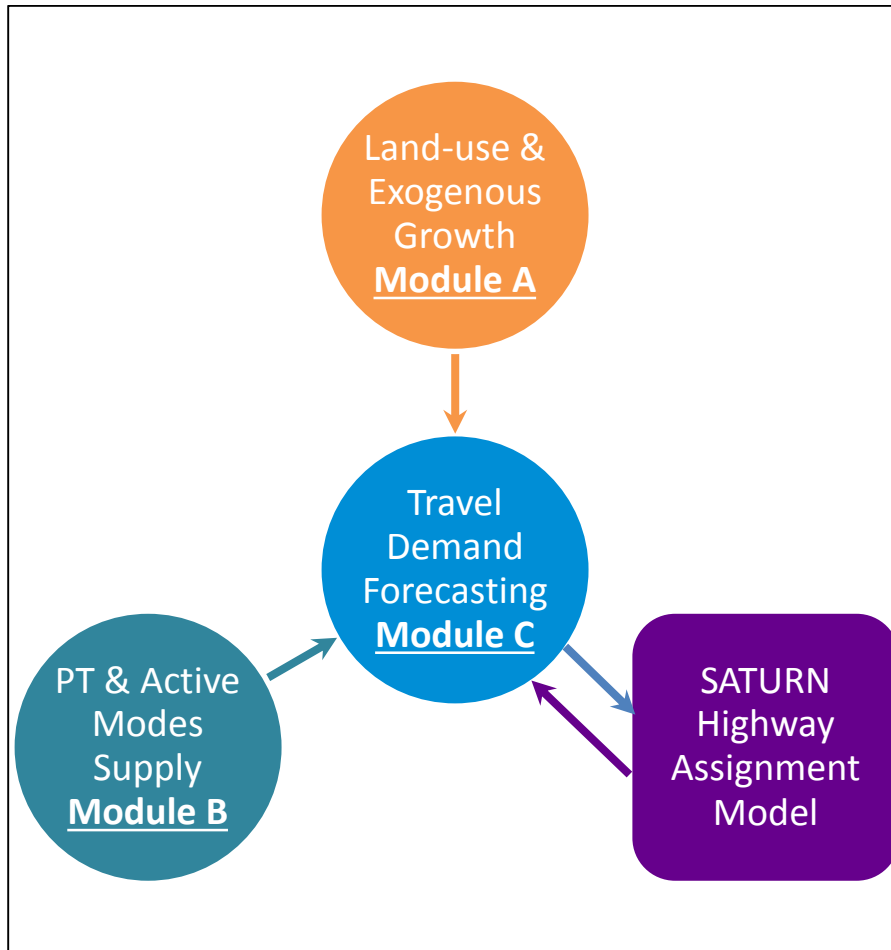
2.2.7 SATURN highway costs are imported into the Module C workbook and an iterative process is used to check that forecast demand has converged relative to changes in costs. Thus the CTFT is capable of representing demand changes to transport costs such that highway flows are more consistent with network capacity.

2.2.8 The CTM and, therefore, the CTFT includes 5 user classes as follows:

- User Class 1 – Car Commute
- User Class 2 – Car Business Use
- User Class 3 – Car Other

- User Class 4 – LGV
- User Class 5 – HGV

Figure 2-1: Crawley Transport Model – Forecast Tool Structure



2.2.9 Module A comprises of the zone definitions and NTEM allocations as well as planning and traffic growth data. The list below outlines the key components within the module:

- National Trip End Model (NTEM) to CTM zone allocation
- NTEM base and forecast data
- Planning data
- Development specific data and trip rates
- Final population and employment forecasts

2.2.10 The zone allocation refers to which NTEM zone is assigned to which Crawley Transport Model zone. The module allows for a choice in how forecast growth is calculated: either from NTEM data or from local planning data. It is also possible to specify development trips and trip rates if these are known for specific developments. The base year has been set up as 2015 and the

forecast years modelled are 2021 and 2030. These years have been used in the TEMPRO (Trip End Model Presentation Program) software 7 to extract NTEM growth rates.

- 2.2.11 In total, there are 292 model zones in CTM and the CTFT. Of the 292 zones, 146 are within Crawley and correspond to the CTM simulation area with the other zones being outside Crawley. The external zones are subject to growth but no other demand responses.
- 2.2.12 The Module A forecast planning data is used to calculate population and employment growth for each zone from the base year to the forecast year. This data is copied over to Module C as part of the CTFT run procedures and future SATURN matrices are output from the tool for assignment in SATURN.

3 Future Development and Schemes

3.1 Overview

- 3.1.1 Forecast development growth includes 'near certain' and 'more than likely' development in Crawley as well as background growth. Including 'more than likely' development in addition to committed development has the objective of deriving a realistic and plausible scenario of the future.
- 3.1.2 In addition to future development, highway infrastructure schemes with a reasonable certainty of being implemented within the forecast years have been considered and where appropriate, coded into the future SATURN networks. These schemes were provided by WSCC.

3.2 Future Development

- 3.2.1 The future development considered in the uncertainty log is shown in Appendix B for residential development, and in Appendix C for employment development. The uncertainty log includes all presently known development classified into one of four of the WebTAG probability categories. The categories are summarised in Table 3-1. In line with WebTAG guidance, only development classified as near certain or more than likely has been included in the 2021 and 2030 forecasts as appropriate. This scenario is called the Core Scenario. A threshold of 25 dwelling units was used to explicitly point-load any residential development that fell into these categories. Developments smaller than this were assumed to be accounted for in background growth. No threshold was set for employment uses.
- 3.2.2 The Core Scenario is considered a realistic representation of what is likely to happen regarding future development and infrastructure schemes in the CTM. It is intended to be the best basis for decision making, given current evidence. It will form a basis against which future schemes or interventions will be compared. For ease of reporting, the scenario is termed Do Minimum (DM) in this report.

3.3 NTEM 7

- 3.3.1 The current dataset used has been NTEM 7.0. DfT have issued a statement on 14th November 2016, indicating an issue with some of the datasets for some areas, which included Crawley Borough. Whilst some of the data sets are erroneous the relevant statement reads:

"It is the Department's view that until the addendum is released NTEM7.0 continues to provide the most up-to-date dataset for use in transport business cases and a robust basis for developing forecasts in the vast majority of cases. However, NTEM users are advised to take particular care when applying the dataset in the affected area."

- 3.3.2 When new data is released the forecast modelling may need reviewing to check whether the revised data will impact on the outputs.

Table 3-1 WebTAG Probability classification of future development inputs

Probability of the Input	Status	Core Scenario Assumption delays)
Near certain: The outcome will happen or there is a high probability that it will happen	Intent announced by proponent to regulatory agencies. Approved development proposals. Projects under construction	This should form part of the core scenario
More than likely. The outcome is likely to happen, but there is significant uncertainty	Submission of planning or consent application imminent. Development application within consent process.	This could form part of the core scenario [Refer to Section Developing the Core Scenario]
Reasonably foreseeable. The outcome may happen, but there is significant uncertainty	Identified within a development plan. Not directly associated with the transport strategy/scheme, but may occur if the strategy/scheme is implemented. Development conditional upon the transport strategy/scheme proceeding. Or, a committed policy goal subject to tests (e.g. of deliverability) whose outcomes are subject to significant uncertainty.	These should be excluded from the core scenario but may form part of the alternative scenarios
Hypothetical: There is considerable uncertainty whether the outcome will ever happen.	Conjecture based upon currently available information. Discussed on conceptual basis. One of a number of possible inputs in an initial consultation process. Or a policy aspiration	These should be excluded from the core scenario but may form part of the alternative scenarios

3.4 Future Highway Schemes

3.4.1 The future schemes that have been coded into the 2021 and 2030 SATURN networks are shown in Appendix D. These have also been informed by the uncertainty log. WSCC provided details of future schemes with a near certain and more than likely likelihood of implementation in three broad categories:

- Works Programme Integrated Schemes
- Crawley Local Plan Mitigation Schemes

- Consented Development – Developer Funded Section 106 and Section 278 Schemes
- 3.4.2 The schemes as appropriate were coded into the 2021 and/or 2030 SATURN works, using the validated 2015 base year network as the starting point. Appendix D also indicates the coding approach assumed in SATURN for each scheme.

4 Traffic Forecast Analysis

4.1 Introduction

4.1.1 This section provides an analysis of the forecast year models to demonstrate that the models are behaving logically and to expectation. The analysis includes a presentation of convergence statistics to show that the models are stable and conform with WebTAG guidance for model convergence. The analysis also presents summary statistics for network performance as measured by parameters such as total network trips assigned, total network journey times and total network kilometres travelled.

4.2 Highway Model Convergence

4.2.1 The highway assignment methodology is based on Wardrop User Equilibrium (UE). The convergence of the 2021 and 2030 models is summarised in Table 4-1 and Table 4-2 respectively. Data is given for the final four assignment/simulation loops for each model, in line with WebTAG guidance. The results show that all the models achieve acceptable convergence and in particular all models achieve a gap value of less than 0.1%. A gap of under 1% is regarded as satisfactory and this is more than achieved by all the models. Good model convergence indicates that the models are stable and model results may be considered to be robust.

Table 4-1: 2021DM CTM Convergence Statistics

AM				IP				PM			
Iteration	% Gap Delta	% Flow	%Cost Delays	Iteration	% Gap Delta	% % Flow ow	%Cost Delays	Iteration	% Gap Delta	% Flow	% Cost Delay
41	0.0020	99.1	99.4	56	0.0025	99.1	99.7	23	0.0060	98.6	98.9
42	0.00099	98.5	99.2	57	0.0019	99.6	99.9	24	0.0062	98.7	99.2
43	0.00080	99.0	99.7	58	0.0020	99.6	99.7	25	0.0037	99.3	99.3
44	0.0013	99.3	99.5	59	0.0020	99.5	99.7	26	0.0039	99.3	99.3

Table 4-2: 2030DM CTM Convergence Statistics

AM				IP				PM			
Iteration	% Gap Delta	% Flow	%Cost Delays	Iteration	% Gap Delta	% % Flow ow	%Cost Delays	Iteration	% Gap Delta	% Flow	% Cost Delay
22	0.0036	98.6	99.6	60	0.0029	99.2	99.7	104	0.0053	98.3	98.8
23	0.0050	98.6	99.5	61	0.0022	99.6	99.8	105	0.0053	98.1	99.0
24	0.0031	98.2	99.6	62	0.0030	98.9	99.8	106	0.0053	98.2	98.9
25	0.0030	99.4	99.7	63	0.0017	99.5	99.7	107	0.0024	98.1	99.0

4.2.2 The low % GAP values of all models are less than 0.1%, and the high %Flows and %Delays values indicate that a satisfactory level of convergence has been achieved within the highway model in all cases.

4.3 Network Summary Statistics

4.3.1 Network summary statistics have been extracted from the models and these are shown in Table 4-3. The summary statistics are a measure of network wide performance. It is generally to be expected that as traffic growth increases in the future, network performance may deteriorate as congestion increases. The forecasting approach using the CTFT as described in Section 2, aims as far as possible to create demands that are consistent with available network capacity or supply.

Table 4-3: Network Summary Statistics

Year	Scenario	Trips (PCU's/HR)	Total Travel Time (PCU/Hr)	Total Travel Distance (PCU KM/HR)	Average Speed (KMH/HR)	Over Capacity Queues (PCU HRS/HR)
2021	DMAM	58,783.3	7,337.3	412,295.0	56.2	896.3
2030	DMAM	61,337.5	8,529.9	428,105.0	50.2	1,746.3
2021	DMIP	42,473.5	4,544.5	308,238.8	67.8	24.6
2030	DMIP	44,603.5	4,839.1	323,643.7	66.9	35.7
2021	DMPM	59,033.6	8,654.6	404,203.5	46.7	1,557.1
2030	DMPM	61,605.5	9,402.4	420,503.3	44.7	1,922.0

4.3.2 The model summary statistics indicate that the models are behaving as expected, and that the underlying trends in the summary statistics are logical and to expectation. Between 2021 and 2030 for each time period, trips on the network increase between 2021 and 2030 due to increased growth or demand. Consequently, network speeds may fall and queues increase. Longer routes may also be used as drivers seek seemingly quicker but longer routes to avoid congested local routes. These trends are largely evident across all three time periods when 2021 statistics are compared to 2030 performance statistics.

4.3.3 There is a noticeable increase in overcapacity queues in the AM peak model between 2021 and 2030. An analysis of the models using SATURN's graphics module P1X, suggests that this is due to a cumulative increase at various locations in the network rather than at a specific location. There are, however, a number of junctions that have been identified in the future networks which consistently have delays greater than 5 minutes. These can be considered as junctions that would warrant further consideration when ascertaining the implications of future intervention schemes. The junctions are identified in Section 4.4. It was also identified in P1X that in 2030, there is some reassignment from Horsham Road to Brighton Road and/or the smaller roads to the west of the model. Reassignment from Horsham Road is due to the addition of the signals at Horsham Road/Crawley Avenue junction in the 2030 model which do not work very well but are a committed scheme for Kilnwood Vale.

4.3.4 In all scenarios, speeds in 2030 are lower than those in 2021 for the equivalent time period. This suggests that despite increased vehicle kilometres in 2030 due to both increased demand and re-routing to longer routes, the use of longer routes is not necessarily adequate

to offset falling speeds due to congestion. This suggests that drivers may take longer routes, although there is a limit as to the extent of re-routeing to longer routes.

- 4.3.5 It is also noted that the PM peak model is the most congested, followed by the AM peak. The IP model is the least congested. All these trends are generally in line with expectation and further give confidence that the forecast models are showing logical trends and are robust.

4.4 Junction Delays

- 4.4.1 An analysis has been undertaken to identify junctions with excessive delays. Junctions with delays greater than or equal to 5 minutes (300seconds), as measured by the worst performing arm in each time period, have been considered to fall into this category. These junctions would warrant further consideration in ascertaining the implications of future intervention schemes. The junctions are shown in Table 4-4 for the AM peak and Table 4-5 for the PM peak. There were no such junctions in the IP models.

Table 4-4: AM Junctions Junction delays (seconds)

Node Number	Type	Location	2021DMAM	2030DMAM	Diff (seconds)
11148	Priority	Manor Royal/Gatwick Road	843	2644	1801
2546	Priority	Ironsbottom/Reigate Road	1590	2276	686
14002	Signal	Radford Road (signal) east of Gatwick Road/Radford Road roundabout	132	321	189

Table 4-5: PM Junctions delays (seconds)

Node Number	Type	Location	2021DMPM	2030DMPM	Diff (seconds)
2546	Priority	Ironsbottom/Reigate Road	2937	3318	381
1814	Signal	Manor Royal/London Road	2727	2769	42
1860	Roundabout	Broadfield Roundabout	484	458	-26
1617	Priority	M23 Junction 11/Brighton Road approach	684	747	63
1610	Priority	M23 Junction 11-A23 Brighton Road approach	256	328	72

4.5 Summary

- 4.5.1 This section has given an analysis of the forecast models. The models have been shown to converge well and achieve WebTAG convergence criteria. Summary statistics have been presented and these have been seen to be logical and to expectation. A number of junctions with excessive delays have been identified that would warrant further consideration when ascertaining the implications of future intervention schemes. In conclusion, the forecast models are logical and robust and can form the basis against which the known future intervention measures can be compared against.

Appendix A Crawley Transport Forecasting Tool (CTFT)

TECHNICAL NOTE

Job Name: Crawley Transport Model
Job No: 35981
Note No: 001
Date: 28/11/2016
Prepared by: David Collis **Checked by:** Andrew Bagnall **Approved by:** Sarah Matthews
Subject: **Crawley Transport Forecasting Tool**

Item	Subject
1.	<p>Introduction</p> <p>Peter Brett Associates LLP (PBA) has been commissioned by West Sussex County Council (WSCC) to develop the Crawley Transport Model (CTM). The aim of the project is to develop a traffic model with a base year of 2015 that will be used to test a number of infrastructure schemes and development proposals within the Crawley area.</p> <p>The immediate need for the CTM is to support a funding bid to the Local Enterprise Partnership for the Crawley Area Transport Package Phase Two schemes in and around Crawley. The Phase Two Package will draw on work undertaken by WSCC to develop a Strategic Infrastructure Package and by Crawley Borough Council in consultation to develop the borough's Infrastructure Delivery Plan, including the Crawley Town Centre feasibility study. The detailed study area includes the urban area of Crawley and Gatwick Airport in order for the model to be capable of assessing local access improvements to the Airport, which is located in the Borough.</p> <p>The Crawley Transport Forecasting Tool (CTFT) has been created alongside the CTM to forecast demand and estimate traffic demand responses to changes in the modelled highway network and high-level representations of public transport and active model interventions. The CTFT is comprised of a number of spreadsheet modules that interact with the SATURN highway model. This Note describes the preparation of the CTFT.</p>
2.	<p>Overview of Tool</p> <p>The CTFT is comprised of 3 spreadsheet modules prepared in Microsoft Excel as follows:</p> <ul style="list-style-type: none"> • Module A – Land use and growth data • Module B – Public Transport and Active Modes data • Module C – Demand adjustment and control worksheet

DOCUMENT ISSUE RECORD

Technical Note No	Rev	Date	Prepared	Checked	Reviewed (Discipline Lead)	Approved (Project Director)
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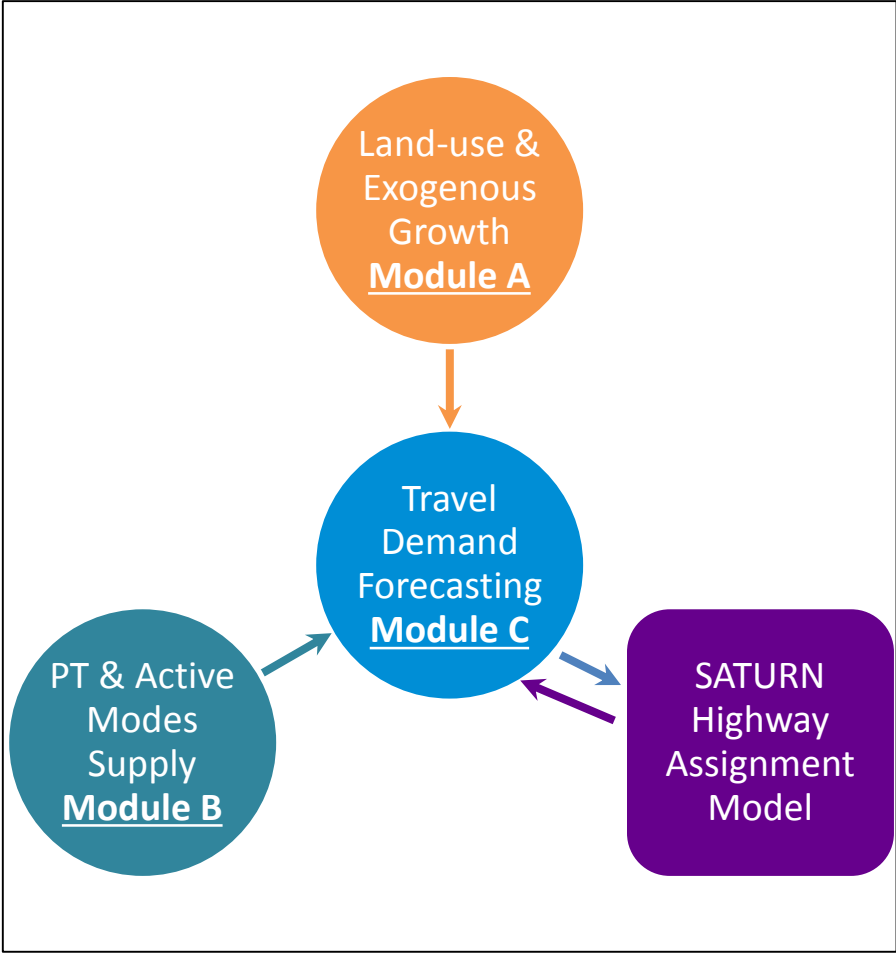
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Peter Brett Associates LLP Caversham Bridge House Waterman Place, Reading Berkshire RG1 8DN

T: +44 (0)118 950 0761 +44 (0)118 959 7498 E: reading@peterbrett.com



TECHNICAL NOTE

Item	Subject
	<p>Figure 1 below gives a visual representation as to how the modules interact with each other and with the SATURN model.</p> <div data-bbox="301 389 1201 1339" style="border: 1px solid black; padding: 10px; margin: 10px 0;">  <pre> graph TD A((Land-use & Exogenous Growth Module A)) --> C((Travel Demand Forecasting Module C)) B((PT & Active Modes Supply Module B)) --> C C <--> S[SATURN Highway Assignment Model] </pre> </div> <p><i>Figure 1: CTFT Module Structure</i></p> <p>The CTFT is designed that the information regarding files locations is entered into Module C. The control worksheet in Module C is then used to run the model. The code underlying Module C will automatically copy the relevant data from the other modules and undertake specified SATURN model assignment(s).</p> <p>SATURN highway costs are imported into the Module C workbook and an iterative process is used to check that forecast demand has converged relative to changes in costs.</p> <p>The CTM and, therefore, the CTFT includes 5 user classes as follows:</p> <ul style="list-style-type: none"> • User Class 1 – Car Commute • User Class 2 – Car Business Use • User Class 3 – Car Other • User Class 4 – LGV • User Class 5 – HGV
3.	Module A

TECHNICAL NOTE

Item	Subject
	<p>Module A is comprised of the zone definitions and NTEM allocations as well as planning and traffic growth data. The list below outlines the key components within the module:</p> <ul style="list-style-type: none"> • NTEM to CTM zone allocation • NTEM base and forecast data • Planning data • Development specific data and trip rates • Final population and employment forecasts <p>The zone allocation refers to which NTEM zone is assigned to which Crawley Transport Model zone. The module allows for a choice in how forecast growth is calculated: either from NTEM data or from local planning data. It is also possible to specify development trips and trip rates if these are known for specific developments. The base year has been set up as 2015 and the forecast year is currently 2030. These years have been used in the TEMPRo (Trip End Model Presentation Program) version 7 software to extract NTEM growth rates.</p> <p>In total there are 292 model zones in CTM and the CTFT. Of the 292 zones, 146 are within Crawley and correspond to the CTM simulation area with the other zones being outside Crawley. The external zones are subject to growth but no other demand responses.</p> <p>The Module A forecast planning data is used to calculate population and employment growth for each zone from the base year to the forecast year. This data is copied over to Module C as part of the CTFT run procedures so there is no need to copy data manually.</p>

TECHNICAL NOTE

4. Module B

Module B comprises public transport and active modes data. The list below outlines the key components within the module:

- Active modes (walk and cycle) distance and travel time
- Allocation of public transport (bus and train) stops to CTM zones
- Analysis of direct stop to stop public transport journeys
- List of interchange stops for linked journeys
- Analysis of fastest PT journeys between each zone
- OD matrix of PT and active modes demand

The active mode distances between each CTM zone pair have been calculated using GIS and are crow-fly distances. The distances have then been converted into time by using standard (and adjustable) parameters. Currently the walk speed has been set as 4.8km/hr and the cycle speed has been set as 16km/hr and these can be adjusted by the user.

The public transport distances (and times) have been mapped to the CTM zones using GIS. These times are then combined with the bus service data for the area to derive the travel time between the two zones.

As some trips may utilise more than one bus service there is a need to define potential interchange locations. Crawley bus station and Gatwick airport (both the north and south terminals) have been selected as interchange locations as they are the most likely places for users to get a connecting service. This determines public transport times for zone pairs where there isn't a direct route. If there is no interchange route available, then a maximum value of 3 hours has been used. It is possible to add new interchange locations to Module B if required (see user guide for details). The module automatically works out the route/services with the lowest time between two zones.

Rail stations have had their locations set to match the nearest bus stop to allow for easier process and matching of stops. This also allows for rail to be part of linked trips if either the start or end stop is linked to an interchange. Both Crawley and Gatwick Airport stations are linked to interchange stops.

To consider mode choice responses, public transport fares are included in the CTFT. The default fare used within the model is £1.86 however this value can be user defined. The £1.86 figure has been derived by analysing fare data provided by Metrobus for October 2015. Fares are converted into generalised time using commuter values of times (£6.81 per hour) (this figure is due to change in November 2016 and may need to be updated accordingly) from the WebTAG Data Book (Spring 2016 release v1.5 updated July 2016) Table A 1.3.1. This equates the fare of £1.86 into 16 minutes which is added onto every public transport journey. Note this fare is only applied once in the case of interchange trips as it is assumed that users of linked services would purchase a zone pass rather than 2 individual tickets, which is reflected in the average derived fare.

Estimated public transport and active modes demand matrices are included within Module B, which have been derived from NTEM and Census Travel to Work data. Population and employment data for each zone has been applied to NTEM production/attraction rates to derive trips ends that have been used to estimate demand matrices using a distance-based gravity model. Matrices have been prepared for each trip purpose with the demand matrices in Module B summed for all purposes.

The estimated demand matrices have been reviewed to check that the trip length distribution of each mode is reasonable. Checks have been undertaken comparing the distance curves from the OD matrix to those in the National Travel Survey (NTS) data. Comparing these values allowed for calibration of the λ value (this value modifies the deterrence depending on the distance between zones) within the gravity models.

TECHNICAL NOTE

	<p>As with Module A all of the necessary data is copied to Module C as part of the CTFT run procedures so there is no need to copy anything out of Module B manually.</p>
5.	<p>Module C</p> <p>Module C is the main spreadsheet module where the CTFT control worksheet and final CTM forecast matrices are stored. When the “Run” button in Module C is executed the tool should run without further user intervention until final forecast matrices have been created. The list below outlines the key components within Module C:</p> <ul style="list-style-type: none"> • Control worksheet (stores the file location of the other modules and SATURN model) • Base and forecast matrices and trip ends for each CTM user class • Base and forecast car generalised costs (imported from CTM) • Base and forecast PT/active modes generalised costs (imported from Module B) • Growth factors for each zone (imported from Module A) • Development data for each zone (imported from Module A) • Final forecast matrices • Convergence information <p>The control worksheet is the only element in Module C that should be modified by the user. The control worksheet allows the user to specify where all the necessary files are located and what type of run and time period is being analysed.</p> <p>There are two different types of forecasting application within the CTFT Module C:</p> <ul style="list-style-type: none"> • The first is to use the same base and forecast network. This will do a run where the CTM SATURN model network is kept the same and the only thing that will change are traffic growth and/or public transport/active modes provision (i.e. changes in Modules A and/or B). • The second option is to use a different SATURN forecast network. This will use a specified alternative SATURN network in the forecast year to analyse changes in network structure. This option can also be combined with changes to Modules A and/or B. <p>CTFT Module C uses an iterative process to determine the final CTM forecast traffic demand matrices. The CTFT travel demand responses are for car trips only as follows:</p> <ul style="list-style-type: none"> • SATURN cost skims are imported into Module C and compared with the defined base year or reference case scenario from which an elasticity is applied to represent predicted traffic demand responses. For example, an increase in congestion and equivalent generalised costs may reduce traffic demand. • Base and forecast public transport/active mode generalised costs are imported from Module B from which a cross-elasticity is applied to represent predicted traffic demand responses. For example, if public transport costs increase then there may be a shift towards car use over public transport. <p>The iterative convergence process within Module C evaluates the forecast demand and equivalent generalised costs to achieve a stable forecast, i.e. changes in traffic demand relative to cost and vice versa have stabilised. Figure 2 below shows the iterative process between the CTFT and the SATURN model.</p>

TECHNICAL NOTE

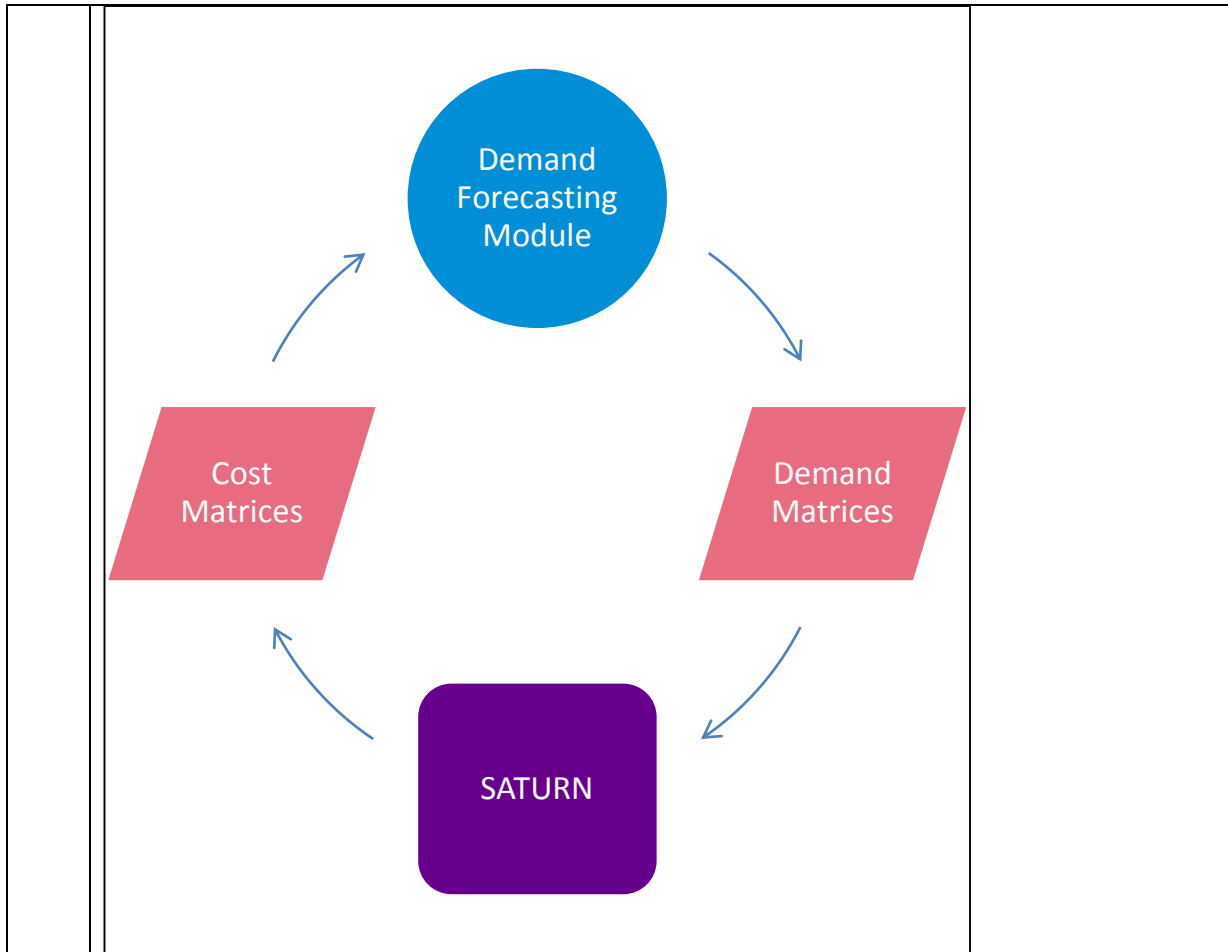


Figure 2: Module C Iterative Process

The convergence criterion compares the change in demand for each user class for each zone. If the zone demands have changed by more than 5% for more than 10% of the zones (30 or more zones) then the convergence test is false. This analysis is undertaken for each user class individually. If the demand-cost iteration has not converged, then a further iteration is undertaken. Currently the CTFT is limited to 10 iterations with a warning message if the model fails to converge within this.

Once the tool has finished processing a message is presented giving the number of iterations taken to arrive at a stable solution. The final forecast matrices can then be found on worksheet 8 (Forecast_Mats).

6. CTFT Testing

To check that the tool is fit for purpose a number of tests have been carried out. In total 5 different tests have been undertaken as follows:

1. No demand or network change
2. Forecast growth but no network change
3. 20% increase to car fuel costs with no growth or network changes
4. 20% increase in public transport fares with no growth or network change
5. Increased network capacity test with no growth

Test 1 and Test 2 are to check that the CTFT is working correctly as there should be no change in forecast demand in the first test and an uplift in traffic demand in the second test. The results

TECHNICAL NOTE

of Test 3 and Test 4 have been compared against WebTAG guidance to check that the outputs are acceptable, noting that the CTFT is not a variable demand model but that the TAG realism test criteria provides a useful source for assessing the forecast outcomes. Finally, Test 5 is expected to see an increase in car demand due to a decrease in car generalised costs caused by increased network capacity.

Test 1 (No Change):

Test 1 runs the tool with the same base and forecast SATURN network and no forecast growth. If the tool is working correctly there should be no change in the resulting demand. The tables below show the overall change in demand for each vehicle type and time period.

AM:

	Car	LGV	HGV	Tot
Base Year	47,441	5,013	5,464	57,918
Forecast (before dev sites added)	47,441	5,013	5,464	57,918
Dev Sites	0	0	0	0
Final Forecast	47,441	5,013	5,464	57,918
Difference Versus Base	-0	+0	0	-0
% Difference	-0.0%	+0.0%	0.0%	-0.0%

IP:

	Car	LGV	HGV	Tot
Base Year	30,330	4,940	5,109	40,379
Forecast (before dev sites added)	30,330	4,940	5,109	40,379
Dev Sites	0	0	0	0
Final Forecast	30,330	4,940	5,109	40,379
Difference Versus Base	-0	+0	+0	+0
% Difference	-0.0%	+0.0%	+0.0%	+0.0%

PM:

	Car	LGV	HGV	Tot
Base Year	47,984	4,302	3,494	55,780
Forecast (before dev sites added)	47,984	4,302	3,494	55,780
Dev Sites	0	0	0	0
Final Forecast	47,984	4,302	3,494	55,780
Difference Versus Base	-0	-0	+0	-0
% Difference	-0.0%	-0.0%	+0.0%	-0.0%

The tables show that there has been no change when running the tool with the same SATURN network and no forecast year growth. This indicates that the CTFT is working correctly.

Test 2 (Forecast Growth):

Test 2 runs the tool with the same SATURN network but includes the forecast growth from NTEM and local Crawley planning data. If the CTFT is working correctly, then there should be

TECHNICAL NOTE

an increase in overall demand to reflect the increased traffic. The tables below show the overall change in demand for each vehicle type and time period.

AM:

	Car	LGV	HGV	Tot
Base Year	47,441	5,013	5,464	57,918
Forecast (before dev sites added)	50,530	5,319	5,837	61,686
Dev Sites	0	0	0	0
Final Forecast	50,530	5,319	5,837	61,686
Difference Versus Base	+3,090	+306	+372	+3,768
% Difference	+6.5%	+6.1%	+6.8%	+6.5%

IP:

	Car	LGV	HGV	Tot
Base Year	30,330	4,940	5,109	40,379
Forecast (before dev sites added)	33,314	5,232	5,436	43,983
Dev Sites	0	0	0	0
Final Forecast	33,314	5,232	5,436	43,983
Difference Versus Base	+2,985	+292	+327	+3,604
% Difference	+9.8%	+5.9%	+6.4%	+8.9%

PM:

	Car	LGV	HGV	Tot
Base Year	47,984	4,302	3,494	55,780
Forecast (before dev sites added)	52,074	4,530	3,720	60,324
Dev Sites	0	0	0	0
Final Forecast	52,074	4,530	3,720	60,324
Difference Versus Base	+4,090	+229	+225	+4,544
% Difference	+8.5%	+5.3%	+6.4%	+8.1%

The tables show an increase in demand for all vehicle types and all time periods. This is to be expected as the forecast growth will result in an increase in trips. Given these results it is considered the CTFT is reacting in a realistic manner.

Test 3 (Fuel Costs):

Test 3 runs the CTFT with the no forecast growth but uses a forecast CTM SATURN model with a 20% increase in fuel costs. It is expected that this should cause a reduction in car trips resulting from increased generalised costs. It shouldn't affect the LGV or HGV trips as they are not subject to demand responses in the CTFT.

The resulting demand has been compared against WebTAG guidance, to assess if the forecast demand response is reasonable. The elasticity is calculated by taking the logarithm of the forecast demand divided by the base demand and then dividing this by the logarithm of the forecast cost over the base cost. This is outlined in the formula below.



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$$e = \frac{\log(T^1) - \log(T^0)}{\log(C^1) - \log(C^0)} = \frac{\log\left(\frac{T^1}{T^0}\right)}{\log\left(\frac{C^1}{C^0}\right)}$$

Where T is demand and C is cost and the subscripts 0 and 1 denote before and after the change in cost respectively. Note that demand here refers to total vehicle kilometres and not number of trips. As the fuel cost has been increased by 20% this will mean that C^1/C^0 will be 1.2 so the bottom of the elasticity equation will be $\log(1.2)$.

Section 6.4 of WebTAG unit M2 suggests that the car fuel elasticity should be between -0.25 and -0.35.

The elasticities have been calculated by only analysing internal trips, as the external demands are frozen in the CTFT. Including external demand would therefore show the elasticity to be smaller than it actually is.

The tables below show the overall change in demand for each vehicle type and time period. Each time period also has a second table that shows the elasticity for each user class within the time period (base and forecast units are vehicle kilometres as outlined above).

AM:

	Car	LGV	HGV	Tot
Base Year	47,441	5,013	5,464	57,918
Forecast (before dev sites added)	46,505	5,013	5,464	56,982
Dev Sites	0	0	0	0
Final Forecast	46,505	5,013	5,464	56,982
Difference Versus Base	-936	+0	0	-936
% Difference	-2.0%	+0.0%	0.0%	-1.6%

	Base	Forecast	Elasticity
UC1	17,199,349	16,289,291	-0.298
UC2	24,087,832	22,743,808	-0.315
UC3	3,473,984	3,438,550	-0.056
Total	44,761,166	42,471,650	-0.288

The elasticities for all combined car trips and user classes 1 and 2 (car commute and car business use) both fall in the -0.25 to -0.35 range specified in WebTAG. User class 3 (other car trips) however has a lower elasticity due to non-work trips being less affected by fuel cost.

IP:

	Car	LGV	HGV	Tot
Base Year	30,330	4,940	5,109	40,379
Forecast (before dev sites added)	29,811	4,940	5,109	39,860
Dev Sites	0	0	0	0
Final Forecast	29,811	4,940	5,109	39,860
Difference Versus Base	-518	+0	+0	-518
% Difference	-1.7%	+0.0%	+0.0%	-1.3%



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	Base	Forecast	Elasticity
UC1	2,518,388	2,377,590	-0.316
UC2	19,373,157	18,296,595	-0.314
UC3	3,453,850	3,424,678	-0.047
Total	25,345,396	24,098,863	-0.277

As with the AM the elasticities for all combined car trips and user classes 1 and 2 are within the expected range. User class 3 is lower than the range with a similar elasticity to the AM however.

PM:

	Car	LGV	HGV	Tot
Base Year	47,984	4,302	3,494	55,780
Forecast (before dev sites added)	47,331	4,302	3,494	55,127
Dev Sites	0	0	0	0
Final Forecast	47,331	4,302	3,494	55,127
Difference Versus Base	-653	-0	+0	-653
% Difference	-1.4%	-0.0%	+0.0%	-1.2%

	Base	Forecast	Elasticity
UC1	13,386,852	12,756,463	-0.265
UC2	11,530,344	11,009,037	-0.254
UC3	4,984,005	4,931,796	-0.058
Total	29,901,201	28,697,297	-0.225

As with the AM and IP time periods the elasticity for all combined car trips and for user classes 1 and 2 are within the expected range with a lower elasticity for user class 3.

Given these results it is considered the CTFT is reacting in a realistic manner.

Test 4 (Public Transport Costs):

Test 4 runs the CTFT with the same demand and SATURN network but includes a version of the Module B workbook with 20% increased fares. This is expected to make public transport become a less attractive option with an increase in car trips. LGV and HGV trips should be unaffected.

To calculate the elasticity, the change in car demand has been used to approximate the change in public transport passengers. The change in car demand (in vehicles) has been multiplied by 1.4 to convert the change in vehicles to persons (i.e. assuming average vehicle occupancy of 1.4). This value has then been compared against the total estimated public transport demand (from Module B) to calculate the elasticity. WebTAG unit M2 section 6.4 suggests that the elasticity for bus fares should be between -0.2 and -0.9.

The tables below show the overall change in demand for each vehicle type and time period.

TECHNICAL NOTE

AM:

	Car	LGV	HGV	Tot
Base Year	47,441	5,013	5,464	57,918
Forecast (before dev sites added)	47,470	5,013	5,464	57,947
Dev Sites	0	0	0	0
Final Forecast	47,470	5,013	5,464	57,947
Difference Versus Base	+29	+0	0	+29
% Difference	+0.1%	+0.0%	0.0%	+0.0%

The table shows a small increase in vehicle trips which given an average car occupancy of 1.4 results in a total of $29 \times 1.4 = 40.6$ people switching mode. This is subtracted from the base PT demand (1,072) to give the forecast demand (1,031) and then put into the elasticity equation to give the following result:

$$e = \frac{\log\left(\frac{1031}{1072}\right)}{\log(1.2)} = -0.21$$

This is between -0.2 and -0.9 as set out in the WebTAG guidance.

IP:

	Car	LGV	HGV	Tot
Base Year	30,330	4,940	5,109	40,379
Forecast (before dev sites added)	30,345	4,940	5,109	40,395
Dev Sites	0	0	0	0
Final Forecast	30,345	4,940	5,109	40,395
Difference Versus Base	+16	+0	+0	+16
% Difference	+0.1%	+0.0%	+0.0%	+0.0%

The table shows a small increase in vehicle trips which given an average car occupancy of 1.4 results in a total of $16 \times 1.4 = 22.4$ people switching mode. This is subtracted from the base PT demand (766) to give the forecast demand (744) and then put into the elasticity equation to give the following result:

$$e = \frac{\log\left(\frac{744}{766}\right)}{\log(1.2)} = -0.16$$

This value is a little bit below the range specified in WebTAG but is not considered an issue for CTFT which isn't a full variable demand model.

TECHNICAL NOTE

PM:

	Car	LGV	HGV	Tot
Base Year	47,984	4,302	3,494	55,780
Forecast (before dev sites added)	48,003	4,302	3,494	55,799
Dev Sites	0	0	0	0
Final Forecast	48,003	4,302	3,494	55,799
Difference Versus Base	+19	-0	+0	+19
% Difference	+0.0%	-0.0%	+0.0%	+0.0%

The table shows a small increase in vehicle trips which given an average car occupancy of 1.4 results in a total of $19 \times 1.4 = 26.6$ people switching mode. This is subtracted from the base PT demand (838) to give the forecast demand (811) and then put into the elasticity equation to give the following result:

$$e = \frac{\log\left(\frac{811}{838}\right)}{\log(1.2)} = -0.18$$

As with the IP time period the elasticity is a little bit lower than the range specified in WebTAG but is not considered an issue for CTFT which isn't a full variable demand model.

The PT costs traffic demand cross-elasticity value used in the CTFT is 0.057 which has been adopted from Table 9.12 of "The demand for public transport: a practical guide" by TRL. It is possible to adjust the elasticity by changing this value in cell AN1 on worksheet 4b of Module C if required.

Given these results, it is considered that the CTFT is reacting in a realistic manner.

Test 5 (Higher Capacity Network):

Test 5 runs the CTFT with the same forecast demand as the base but with a new higher capacity SATURN network. The new network consists of a hypothetical (but possible) bypass to the west of Crawley. This bypass would link the A264 Faygate roundabout with the Ifield Avenue roundabout and the A23 London Road roundabout. These are defined by nodes 7020, 9071 and 3015 respectively in the CTM SATURN model. It is expected that these changes would lower car travel costs slightly and result in an increase in car demand.

The tables below show the overall change in demand for each vehicle type and time period.

AM:

	Car	LGV	HGV	Tot	Car (Internals)
Base Year	47,441	5,013	5,464	57,918	11,252
Forecast (before dev sites added)	47,868	5,013	5,464	58,345	11,508
Dev Sites	0	0	0	0	0
Final Forecast	47,868	5,013	5,464	58,345	11,508
Difference Versus Base	+427	+0	0	+427	+256
% Difference	+0.9%	+0.0%	0.0%	+0.7%	+2.3%

TECHNICAL NOTE

As the external trips have been frozen, it would be underestimating the change to include these when calculating the change in demand. Due to this, the final column in the table looks at the change in internal to internal trips. The results show a small but notable increase in car demand. This seems reasonable given the increase in network capacity.

IP:

	Car	LGV	HGV	Tot	Car (Internals)
Base Year	30,330	4,940	5,109	40,379	6,533
Forecast (before dev sites added)	30,376	4,940	5,109	40,425	6,562
Dev Sites	0	0	0	0	0
Final Forecast	30,376	4,940	5,109	40,425	6,562
Difference Versus Base	+46	+0	+0	+46	+30
% Difference	+0.2%	+0%	+0%	+0%	+0.5%

The table shows a smaller change than in the AM. This is because traffic demand is lower in the inter-peak period and the network is less congested. As a result of this, the change in costs and therefore demand will be lower than in the AM.

PM:

	Car	LGV	HGV	Tot	Car (Internals)
Base Year	47,984	4,302	3,494	55,780	7,235
Forecast (before dev sites added)	48,339	4,302	3,494	56,134	7,422
Dev Sites	0	0	0	0	0
Final Forecast	48,339	4,302	3,494	56,134	7,422
Difference Versus Base	+355	-0	+0	+355	+187
% Difference	+0.7%	-0%	+0%	+1%	+2.6%

The PM table shows a similar change to the AM. This is to be expected, as it is likely there is congestion in both time periods and that there would be a greater response than seen in the inter-peak.

Given these results, it is considered that the CTFT is reacting in a realistic manner.

7. Summary

Peter Brett Associates LLP has been commissioned to update to the Crawley Transport Model (CTM). The Crawley Transport Forecasting Tool (CTFT) has been created alongside the CTM to allow for forecasting of various transport interventions.

The CTFT is split into 3 different modules which perform specific functions. Module A stores the NTEM growth data as well as the planning data for the CTM zones. Module B contains public transport and active modes data. Module C is the control workbook, where final forecast CTM traffic demand matrices are stored.

The CTFT has been evaluated with 5 different tests to check that it functions appropriately and that the outputs are intuitive. The tests were as follows:

TECHNICAL NOTE

1. No demand or network change
2. Forecast growth but no network change
3. 20% increase to car fuel costs with no growth or network changes
4. 20% increase in public transport fares with no growth or network change
5. Increased network capacity test with no growth

Tests 1, 2 and 5 were undertaken by comparing the base and forecast demand and checking that the outputs were reasonable. Tests 3 and 4 were undertaken by comparing the CTFT outputs with WebTAG guidance to check that the outputs are acceptable, noting that the CTFT is not a variable demand model but that the TAG realism test criteria provides a useful source for assessing the forecast outcomes. The testing has indicated that the CTFT functions appropriately and that the results are realistic.

Appendix B Development Uncertainty Log - Residential

Reference No	Development Name/Planning Application Reference	Location/Address	Status (See LMFTR Table 3-1)	SATURN Zone No. (estimation by PBA)	Total Number of Dwellings	Projected Number of Dwellings Completed by 2021 (Core Scenario)	Projected Number of Dwellings Completed by 2030 (Core Scenario)	Remarks/Comments if any (eg such as source of information)
1	CR/2012/0577/FUL	ALPINE WORKS, OAK ROAD, SOUTHGATE, CRAWLEY	Near Certain	42	7	7	7	Completed during Q1 2015/16
2	CR/2012/0324/FUL	CRAWLEY COMMUNITY CHURCH, 40 SPRINGFIELD ROAD, SOUTHGATE, CRAWLEY	More Than Likely	30	8	8	8	Has planning permission
3	CR/2013/0388/FUL	SCOUT GROUP & GUIDES HALL & GARAGES ADJ TO 53 LARK RISE, LANGLEY GREEN, CRAWLEY	Near Certain	104	9	9	9	Completed during Q1 2015/16
4	CR/2014/0175/FUL	LAND ADJ TO 45 MILL ROAD, THREE BRIDGES, CRAWLEY	Near Certain	55	1	1	1	Commenced Q1 2015/16 and completed Q4 2015/16
5	CR/2014/0777/FUL	GALES PLACE, THREE BRIDGES, CRAWLEY	Near Certain	51	13	13	13	Has planning permission (commenced Q4 of 2015/16)
6	CR/2013/0066/FUL	FORMER BEWBUSH LEISURE CENTRE SITE, BREEZEHURST DRIVE, BEWBUSH, CRAWLEY	Near Certain	88	112	112	112	Development completed by end of Q1 2015/16
7	CR/2013/0670/FUL	50 IFIELD DRIVE, IFIELD, CRAWLEY	Near Certain	99 or 100	1	1	1	Development commenced in Q4 2014/15 & completed Q3 2015/16
8	CR/2013/0332/PA3	UNITS 1-14, PELHAM COURT BUSINESS CENTRE, PELHAM PLACE, BROADFIELD, CRAWLEY	Near Certain	78	28	28	28	Completed during 2015
9	CR/2014/0004/FUL; CR/2014/0412/FUL	FIRST AND SECOND FLOORS, 2 THE PAVEMENT, NORTHGATE, CRAWLEY	Near Certain	16	2	2	2	Permitted during 2014 (Commenced & completed Q4 2015/16)
10	CR/2015/0659/FUL (not yet determined)	22 BRIGHTON ROAD (FIRST AND SECOND FLOORS), SOUTHGATE, CRAWLEY	More Than Likely	44	1	1	1	Commenced Q3 2015/16
11	CR/2015/0206/FUL	6 BRIGHTON ROAD, SOUTHGATE, CRAWLEY	Near Certain	18 or 44	2	2	2	Permitted Q1 2015/16 (commenced Q4 2015/16)
12	CR/2015/0394/FUL	FIRST FLOOR, 37 & 37A HIGH STREET, NORTHGATE, CRAWLEY	Near Certain	17 or 11	1	1	1	Permitted Q2 2015/16 (commenced Q4 2015/16)
13	CR/2015/0137/FUL	21 BROAD WALK, NORTHGATE, CRAWLEY	Near Certain	16	7	7	7	Permitted Q1 2015/16 (commenced Q4 2015/16)
14	CR/2013/0632/RG3	BRUNEL HALL, BRUNEL PLACE, NORTHGATE, CRAWLEY	Near Certain	22	22	22	22	Permitted in 2014 and completed Q1 2015/16
15	CR/2013/0562/FUL	19 - 21 QUEENSWAY, NORTHGATE, CRAWLEY	Near Certain	12 or 13	10	10	10	Permitted in 2014 and completed Q1 2015/16
16	CR/2015/0686/FUL	12 SPRINGFIELD ROAD, SOUTHGATE, CRAWLEY	Near Certain	18	5	5	5	Completed and permitted retrospectively in Q3 2015/16
17	CR/2013/0291/PA3	DSS CRAWLEY BENEFITS OFFICE THE TREASURY VALUER, CROWN BUILDINGS, 5 THE BOULEVARD, NORTHGATE, CRAWLEY	Near Certain	10	24	24	24	Permitted 2013 and completed Q3 2015/16
18	CR/2014/0343/PA3	BRAMBLETYE HOUSE, 29 BRIGHTON ROAD, SOUTHGATE, CRAWLEY	Near Certain	44	7	7	7	Permitted 2014 and completed Q3 2015/16
19	CR/2015/0090/PA3	ASHBURN HOUSE, BROADFIELD PARK, BRIGHTON ROAD, BROADFIELD, CRAWLEY	Near Certain	74	92	92	92	Permitted Q1 2015/16 and completed Q4 2015/16
20	CR/2012/0166/FUL	LAND ADJACENT TO 132 THREE BRIDGES ROAD, THREE BRIDGES, CRAWLEY	Near Certain	51	1	1	1	Permitted 2012 and completed Q2 2015/16
21	CR/2013/0443/FUL	4 THE PAVEMENT, NORTHGATE, CRAWLEY	Near Certain	12 or 13	2	2	2	Commenced by end of Q2 2015/16
22	CR/2012/0017/FUL	11 - 13, WEST STREET, SOUTHGATE, CRAWLEY	Near Certain	30 or 18	3	3	3	Commenced by end of Q2 2015/16
23	CR/2012/0014/FUL	LAND AT 12 SPRINGFIELD ROAD, SOUTHGATE, CRAWLEY	Near Certain	18	5	5	5	Commenced by end of Q2 2015/16
24	CR/2012/0313/FUL	225 THREE BRIDGES ROAD, THREE BRIDGES, CRAWLEY	Near Certain	51	1	1	1	Commenced by end of Q2 2015/16
25	CR/2013/0365/ARM	LAND TO REAR OF 68 NORTH ROAD, THREE BRIDGES, CRAWLEY	Near Certain	53	1	1	1	Commenced by end of Q2 2015/16
26	CR/2013/0260/FUL	REAR OF 52 HAZELWICK ROAD, THREE BRIDGES, CRAWLEY	Near Certain	55 or 56	3	3	3	Commenced by end of Q2 2015/16
27	CR/2012/0417/FUL	168 THREE BRIDGES ROAD, THREE BRIDGES CRAWLEY	Near Certain	51	1	1	1	Commenced by end of Q2 2015/16
28	CR/2012/0582/FUL	36 ALPHA ROAD AND REAR OF 13 ALBANY ROAD, WEST GREEN, CRAWLEY	Near Certain	31 or 33	4	4	4	Commenced by end of Q2 2015/16
29	CR/2012/0561/FUL	LAND ADJ TO WOODEND, FORGE WOOD, POUND HILL, CRAWLEY	Near Certain	121	1	1	1	Commenced by end of Q2 2015/16
30	CR/2015/0204/FUL	LAND AT CHURCH ROAD NURSERIES, CHURCH ROAD, POUND HILL, CRAWLEY	Near Certain	131	5	5	5	Permitted Q2 and commenced Q3 2015/16
31	CR/2014/0583/FUL	SILCHESTER, HORSHAM ROAD, GOSSOPS GREEN, CRAWLEY	Near Certain	85	1	1	1	Commenced by end of Q2 2015/16
32	CR/2015/0135/FUL	LEAF COTTAGE, FORGE WOOD, POUND HILL, CRAWLEY	Near Certain	131	1	1	1	Permitted Q2 and commenced Q3 2015/16
33	CR/1998/0039/OUT	LAND AT NORTH EAST SECTOR, CRAWLEY	Near Certain	121 (50%), 119 and 120	1900	1075	1900	Commenced
34	CR/2015/0119/FUL	BADGERS BANK, OLD BRIGHTON ROAD (NORTH), BROADFIELD, CRAWLEY	More Than Likely	175	1	1	1	Permitted as of Sept 2015 but not commenced
36	CR/2012/0463/FUL	ERECTION OF SINGLE STOREY FRONT & REAR EXTENSIONS, CONVERSION TO 2 X ONE BED FLATS & INSTALLATION OF 2 X SOLAR PANELS	More Than Likely	94 or 95	1	1	1	Permitted as of Sept 2015 but not commenced
37	CR/2013/0227/FUL	THE MILL HOUSE, HYDE DRIVE, IFIELD, CRAWLEY	More Than Likely	94 or 95	3	3	3	Permitted as of Sept 2015 but not commenced
38	CR/2013/0050/FUL	LAND ADJ TO 18 & 22 LANGLEY LANE, IFIELD, CRAWLEY	More Than Likely	101 or 102 or 103	1	1	1	Permitted as of Sept 2015 but not commenced
39	CR/2014/0406/FUL	54 LANGLEY DRIVE, LANGLEY GREEN, CRAWLEY	More Than Likely	108 or 109	1	1	1	Permitted as of Sept 2015 but not commenced
40	CR/2013/0439/FUL	LAND ADJ TO 13 SQUIRREL CLOSE, LANGLEY GREEN, CRAWLEY	More Than Likely	104	1	1	1	Permitted as of Sept 2015 but not commenced
41	CR/2013/0167/FUL	21 BOLTON ROAD, MAIDENBOWER, CRAWLEY	More Than Likely	142	1	1	1	Permitted as of Sept 2015 but not commenced
42	CR/2011/0002/FUL	THE WYATTS TWO, RADFORD ROAD, TINSLEY GREEN, CRAWLEY	More Than Likely	121	3	3	3	Permitted as of Sept 2015 but not commenced
43	CR/2011/0533/FUL	43 MILTON MOUNT AVENUE, POUND HILL, CRAWLEY	More Than Likely	126	1	1	1	Permitted as of Sept 2015 but not commenced
44	CR/2015/0536/FUL	35 WALTON HEATH, POUND HILL, CRAWLEY, RH10 3UE	More Than Likely	125	1	1	1	Permitted as of Sept 2015 but not commenced
45	CR/2012/0379/OUT	LAND ADJ TO SINGLEGATE, TINSLEY GREEN, POUND HILL, CRAWLEY	More Than Likely	118	1	1	1	Permitted as of Sept 2015 but not commenced
46	CR/2013/0071/FUL	LAND ADJ TO 1 MOAT WALK, POUND HILL, CRAWLEY	More Than Likely	128	1	1	1	Permitted as of Sept 2015 but not commenced
47	CR/2014/0412/FUL	FIRST AND SECOND FLOORS, 2 THE PAVEMENT, NORTHGATE, CRAWLEY	More Than Likely	12 or 13	2	2	2	Permitted as of Sept 2015 but not commenced
48	CR/2013/0490/FUL	FLAT 7 - 9 QUEENSWAY, NORTHGATE, CRAWLEY	More Than Likely	13 or 14	1	1	1	Permitted as of Sept 2015 but not commenced
49	CR/2012/0329/FUL	FIRST FLOOR, 14 - 16 BROAD WALK, NORTHGATE, CRAWLEY	More Than Likely	11 or 17	2	2	2	Permitted as of Sept 2015 but not commenced
50	CR/2012/0507/FUL	6 WOODFIELD ROAD, NORTHGATE, CRAWLEY	More Than Likely	7 or 8	1	1	1	Permitted as of Sept 2015 but not commenced
51	CR/2015/0027/FUL	LAND R/O 138 LONDON ROAD, NORTHGATE, CRAWLEY	More Than Likely	47	1	1	1	Permitted as of Sept 2015 but not commenced
52	CR/2012/0361/FUL	22 THE BOULEVARD, NORTHGATE, CRAWLEY	More Than Likely	12 or 13	2	2	2	Permitted as of Sept 2015 but not commenced
53	CR/2012/0337/FUL	LAND ADJACENT TO 4-6 SPRINGFIELD ROAD, SOUTHGATE, CRAWLEY	More Than Likely	25 or 30	3	3	3	Permitted as of Sept 2015 but not commenced
54	CR/2014/0527/FUL	NIGHTINGALE HOUSE, 1 - 3 BRIGHTON ROAD, SOUTHGATE, CRAWLEY	More Than Likely	44	3	3	3	Permitted as of Sept 2015 but not commenced
55	CR/2011/0400/FUL	22 BRIGHTON ROAD, SOUTHGATE, CRAWLEY	More Than Likely	44	2	2	2	Permitted as of Sept 2015 but not commenced
56	CR/2015/0789/FUL	LAND EAST OF 6 HAREWOOD CLOSE, THREE BRIDGES, CRAWLEY, RH10 8AL	More Than Likely	18 or 44	1	1	1	Permitted as of Sept 2015 but not commenced
57	CR/2015/0688/FUL	150 THREE BRIDGES ROAD, THREE BRIDGES, CRAWLEY	More Than Likely	51	1	1	1	Permitted as of Sept 2015 but not commenced
58	CR/2012/0277/FUL	26 GALES DRIVE, THREE BRIDGES, CRAWLEY	More Than Likely	6 or 7	2	2	2	Permitted as of Sept 2015 but not commenced
59	CR/2014/0483/FUL	FLINT COTTAGE, BRIGHTON ROAD, TILGATE, CRAWLEY	More Than Likely	71	5	5	5	Permitted as of Sept 2015 but not commenced
60	CR/2014/0781/FUL	CRAWLEY MARKET, HIGH STREET, WEST GREEN, CRAWLEY	More Than Likely	26	5	5	5	Permitted as of Sept 2015 but not commenced
61	CR/2015/0598/FUL	31 CRABTREE ROAD, WEST GREEN, CRAWLEY	More Than Likely	34	1	1	1	Permitted as of Sept 2015 but not commenced
62	CR/2012/0314/FUL	21-23 HORSHAM ROAD, WEST GREEN, CRAWLEY	More Than Likely	30	5	5	5	Permitted as of Sept 2015 but not commenced
63	CR/2013/0536/FUL	6-10 IFIELD ROAD, WEST GREEN, CRAWLEY	More Than Likely	26	14	14	14	Permitted as of Sept 2015 but not commenced
64	CR/2012/0394/FUL	KINGSLAND COURT, THREE BRIDGES ROAD, THREE BRIDGES, CRAWLEY	More Than Likely	51	10	10	10	Permitted as of Sept 2015 but not commenced
65	CR/2013/0576/FUL	110-112 SPENCERS ROAD, WEST GREEN, CRAWLEY	More Than Likely	30	10	10	10	Permitted as of Sept 2015 but not commenced

Reference No	Development Name/Planning Application Reference	Location/Address	Status (See LMFR Table 3-1)	SATURN Zone No. (estimation by PBA)	Total Number of Dwellings	Projected Number of Dwellings Completed by 2021 (Core Scenario)	Projected Number of Dwellings Completed by 2030 (Core Scenario)	Remarks/Comments if any (eg such as source of information)
66	CR/2014/0159/PA3 + CR/2014/0811/FUL	SHAW HOUSE, PEGLER WAY, WEST GREEN, CRAWLEY	More Than Likely	26	33	33	33	Permitted as of Sept 2015 but not commenced
67	CR/2015/0110/FUL	40 QUEENS SQUARE, NORTHGATE, CRAWLEY	More Than Likely	16	6	6	6	Permitted as of Sept 2015 but not commenced
68	CR/2015/0137/FUL	21 BROAD WALK, NORTHGATE, CRAWLEY	More Than Likely	17 or 11	7	7	7	Permitted as of Sept 2015 but not commenced
69	CR/2011/0189/OUT	FAIRFIELD HOUSE, WEST GREEN DRIVE, WEST GREEN	Near Certain	28	92	92	92	Commenced by Q3 2015/16
70	CR/2012/0446/ARM	5 - 7 BRIGHTON ROAD, SOUTHGATE, CRAWLEY	Near Certain	18	48	48	48	Commenced by Q3 2015/16
71	CR/2015/0609/FUL	15 - 29 THE BROADWAY, NORTHGATE, CRAWLEY	More Than Likely	12 or 13	78	78	78	Permitted as of Sept 2015 but not commenced
72	CR/2012/0223/FUL	ZURICH HOUSE, FORMERLY ALLIED DUNBAR HOUSE, EAST PARK, SOUTHGATE, CRAWLEY	More Than Likely	21 or 22	59	59	59	Permitted as of Sept 2015 but not commenced
73	CR/2013/0517/OUT + CR/2015/0763/ARM	27 - 45 IFIELD ROAD, WEST GREEN, CRAWLEY	More Than Likely	27	218	218	218	Reserved matters approved Q4 2015/16
74	CR/2014/0046/FUL	LAND FORMERLY LANGLEY GREEN PRIMARY SCHOOL, STAGELANDS, LANGLEY GREEN, CRAWLEY	More Than Likely	110	30	30	30	Permitted as of Sept 2015 but not commenced
75	CR/2015/0389/FUL	SITE OF FORMER IFIELD COMMUNITY COLLEGE, LADY MARGARET ROAD, IFIELD, CRAWLEY	More Than Likely	99 or 100	193	193	193	Permitted as of Dec 2015 but not commenced
76	TINSLEY LANE ALLOCATION	TINSLEY LANE, THREE BRIDGES, CRAWLEY	More Than Likely	49 or 120	120	120	120	Allocated as deliverable site in Local Plan policy H4
77	LAND ADJ DESMOND ANDERSON ALLOCATION	LAND ADJACENT TO DESMOND ANDERSON SCHOOL, TILGATE, CRAWLEY	More Than Likely	70 or 68	100	100	100	Allocated as deliverable site in Local Plan policy H4
78	KILNMEAD CAR PARK ALLOCATION	KILNMEAD CAR PARK, NORTHGATE, CRAWLEY	More Than Likely	5	40	40	40	Allocated as deliverable site in Local Plan policy H4
79	GOFFS PARK DEPOT ALLOCATION	GOFFS PARK DEPOT, SOUTHGATE, CRAWLEY	More Than Likely	43 or 30	30	30	30	Allocated as deliverable site in Local Plan policy H4
80	FORMER TSB SITE ALLOCATION	FORMER TSB SITE, RUSSELL WAY, THREE BRIDGES, CRAWLEY	More Than Likely	57 or 58	40	40	40	Allocated as deliverable site in Local Plan policy H4
81	OAKHURST GRANGE ALLOCATION	OAKHURST GRANGE, SOUTHGATE, CRAWLEY	More Than Likely	42	55	55	55	Allocated as deliverable site in Local Plan policy H4
82	BREEZEHURST DRIVE PLAYING FIELDS	BREEZEHURST DRIVE PLAYING FIELDS, BEWBUSH, CRAWLEY	Reasonably Foreseeable		65	0	0	Allocated as developable site in Local Plan policy H4
83	LONGLEY BUILDING	LONGLEY BUILDING, EAST PARK, SOUTHGATE, CRAWLEY	Reasonably Foreseeable		48	0	0	Allocated as developable site in Local Plan policy H4
84	HENTY CLOSE	HENTY CLOSE, BEWBUSH, CRAWLEY	Reasonably Foreseeable		24	0	0	Allocated as developable site in Local Plan policy H4
85	LAND EAST OF STREET HILL	LAND EAST OF STREET HILL, POUND HILL, CRAWLEY	Reasonably Foreseeable		15	0	0	Allocated as developable site in Local Plan policy H4
86	TELFORD PLACE/HASLETT AVENUE	TELFORD PLACE/HASLETT AVENUE, THREE BRIDGES, CRAWLEY	Reasonably Foreseeable		99	0	0	Identified as 'town centre opportunity site' in Local Plan policy H2
87	CRAWLEY STATION AND CAR PARKS	CRAWLEY STATION AND CAR PARKS, NORTHGATE, CRAWLEY	More Than Likely	22	308	177	308	Identified as 'town centre opportunity site' in Local Plan policy H2; Outline planning application submitted Q1 2016/17 (CR/2016/0294/OUT)
88	COUNTY BUILDINGS	COUNTY BUILDINGS, NORTHGATE, CRAWLEY	Reasonably Foreseeable		50	0	0	Identified as 'town centre opportunity site' in Local Plan policy H2
89	LAND NORTH OF THE BOULEVARD	LAND NORTH OF THE BOULEVARD, NORTHGATE, CRAWLEY	Reasonably Foreseeable		50	0	0	Identified as 'town centre opportunity site' in Local Plan policy H2
90	102-112 LONDON ROAD & 2-4 TUSHMORE LANE	102-112 LONDON ROAD & 2-4 TUSHMORE LANE, NORTHGATE, CRAWLEY	Hypothetical		36	0	0	Identified as 'Broad location' in Local Plan policy H2
91	116-136 LONDON ROAD	116-136 LONDON ROAD, NORTHGATE, CRAWLEY	Hypothetical		53	0	0	Identified as 'Broad location' in Local Plan policy H2
92	138-144 LONDON ROAD	138-144 LONDON ROAD, NORTHGATE, CRAWLEY	Hypothetical		23	0	0	Identified as 'Broad location' in Local Plan policy H2
93	21, 25, 27 & 29 TUSHMORE LANE	21, 25, 27 & 29 TUSHMORE LANE, NORTHGATE, CRAWLEY	Hypothetical		59	0	0	Identified as 'Broad location' in Local Plan policy H2
94	CENTRAL SUSSEX COLLEGE (EAST OF TOWER)	CENTRAL SUSSEX COLLEGE (EAST OF TOWER), THREE BRIDGES, CRAWLEY	Hypothetical		36	0	0	Identified as 'Broad location' in Local Plan policy H2 & EC6
95	FIRE STATION, IFIELD AVENUE	FIRE STATION, IFIELD AVENUE, WEST GREEN, CRAWLEY	Hypothetical		48	0	0	Identified as 'Broad location' in Local Plan policy H2
96	BRITTINGHAM HOUSE, ORCHARD STREET	BRITTINGHAM HOUSE, ORCHARD STREET, WEST GREEN, CRAWLEY	Hypothetical		24	0	0	Identified as 'Broad location' in Local Plan policy H2 & EC6
97	1-7 PEGLER WAY	1-7 PEGLER WAY, WEST GREEN, CRAWLEY	Hypothetical		20	0	0	Identified as 'Broad location' in Local Plan policy H2
98	PARKSIDE CAR PARK	PARKSIDE CAR PARK, NORTHGATE, CRAWLEY	Hypothetical		10	0	0	Identified as 'Broad location' in Local Plan policy H2 & EC6
99	THE OLD VICARAGE, CHURCH WALK	THE OLD VICARAGE, CHURCH WALK, NORTHGATE, CRAWLEY	Hypothetical		18	0	0	Identified as 'Broad location' in Local Plan policy H2
100	LAND ADJ TO STEERS LANE	LAND ADJ TO STEERS LANE, POUND HILL, CRAWLEY	Hypothetical		75	0	0	Identified as 'Broad location' in Local Plan policy H2
101	LAND TO THE SOUTHEAST OF HEATHY FARM, BALCOMBE ROAD	LAND TO THE SOUTHEAST OF HEATHY FARM, BALCOMBE ROAD, POUND HILL	Hypothetical		75	0	0	Identified as 'Broad location' in Local Plan policy H2
102	TRADERS MARKET, HIGH STREET	TRADERS MARKET, HIGH STREET, WEST GREEN, CRAWLEY	More Than Likely	26	6	6	6	Identified as deliverable site in SHLAA
103	OAK TREE FILLING STATION, 114 LONDON ROAD	OAK TREE FILLING STATION, 114 LONDON ROAD, NORTHGATE, CRAWLEY	More Than Likely	47	17	17	17	Identified as deliverable site in SHLAA
104	2-12 FRISTON WALK	2-12 FRISTON WALK, IFIELD, CRAWLEY	Reasonably Foreseeable		15	0	0	Identified as developable in SHLAA
105	REAR GARDENS, DINGLE CLOSE/IFIELD ROAD	REAR GARDENS, DINGLE CLOSE/IFIELD ROAD, WEST GREEN, CRAWLEY	Reasonably Foreseeable		18	0	0	Identified as developable in SHLAA

Reference No	Development Name/Planning Application Reference	Location/Address	Status (See LMFR Table 3-1)	SATURN Zone No. (estimation by PBA)	Total Number of Dwellings	Projected Number of Dwellings Completed by 2021 (Core Scenario)	Projected Number of Dwellings Completed by 2030 (Core Scenario)	Remarks/Comments if any (eg such as source of information)
106	REAR GARDENS, SNELL HATCH/IFIELD ROAD	REAR GARDENS, SNELL HATCH/IFIELD ROAD, WEST GREEN, CRAWLEY	Reasonably Foreseeable		15	0	0	Identified as developable in SHLAA
107	AMBULANCE STATION, IFIELD AVENUE, LANGLEY GREEN, CRAWLEY	AMBULANCE STATION, IFIELD AVENUE	Reasonably Foreseeable		16	0	0	Identified as developable in SHLAA
108	WINDFALLS 2016/17-2029/2030	LOCATIONS NOT SPECIFICALLY IDENTIFIED	Hypothetical		770	0	0	Windfall allowance
109	CR/2015/0295/PA3	CENTRAL HOUSE, 11 - 13 BRIGHTON ROAD, SOUTHGATE, CRAWLEY	Near Certain	44	44	44	44	Had prior approval as of Sept 2015; commenced by end of 2015
110	CR/2015/0374/PA3	MAPLEHURST HOUSE, BROADFIELD PARK, BRIGHTON ROAD, BROADFIELD, CRAWLEY	More Than Likely	71 or 74	69	69	69	Had prior approval as of Sept 2015 but not commenced
111	CR/2015/0192/PA3	11 THE BOULEVARD, NORTHGATE, CRAWLEY	Near Certain	12 or 13	185	185	185	Had prior approval as of Sept 2015; commenced by end of 2015
112	CR/2014/0543/PA3	THE OFFICE BUILDING, GATWICK ROAD, NORTHGATE, CRAWLEY	More Than Likely	119	22	22	22	Had prior approval as of Sept 2015 but not commenced
113	CR/2014/0524/PA3	FIRST CHOICE HOUSE, LONDON ROAD, NORTHGATE, CRAWLEY	More Than Likely	111	94	94	94	Had prior approval as of Sept 2015 but not commenced
114	CR/2014/0138/PA3	STONER HOUSE, LONDON ROAD, NORTHGATE, CRAWLEY	More Than Likely	1	76	76	76	Had prior approval as of Sept 2015 but not commenced
115	CR/2015/0067/PA3	FLIGHT HOUSE, FERNHILL ROAD, HORLEY	More Than Likely	143	6	6	6	Had prior approval as of Sept 2015 but not commenced
116	CR/2015/0102/PA3	BARTON HOUSE, BROADFIELD BARTON, BROADFIELD, CRAWLEY	More Than Likely	78	12	12	12	Had prior approval as of Sept 2015 but not commenced
117	CR/2014/0712/PA3	BELGRAVE HOUSE, STATION WAY, NORTHGATE, CRAWLEY	More Than Likely	20	16	16	16	Had prior approval as of Sept 2015 but not commenced
118	CR/2014/0786/PA3	10 EAST PARK, SOUTHGATE, CRAWLEY	More Than Likely	18	1	1	1	Had prior approval as of Sept 2015 but not commenced
119	CR/2014/0438/PA3	BIRCHFIELD HOUSE, IFIELD ROAD, WEST GREEN, CRAWLEY	More Than Likely	31	1	1	1	Had prior approval as of Sept 2015 but not commenced
120	CR/2014/0391/PA3	8A BRIGHTON ROAD, SOUTHGATE, CRAWLEY	More Than Likely	18	1	1	1	Had prior approval as of Sept 2015 but not commenced
121	CR/2014/0181/PA3	NORTHGATE HOUSE, 115 HIGH STREET, NORTHGATE, CRAWLEY	More Than Likely	10	14	14	14	Had prior approval as of Sept 2015 but not commenced
122	CR/2014/0005/PA3	REAR GROUND, FIRST AND SECOND FLOORS, THE CORN EXCHANGE, 61 - 63 HIGH STREET, NORTHGATE, CRAWLEY	More Than Likely	17	11	11	11	Had prior approval as of Sept 2015 but not commenced
123	CR/2014/0236/PA3	6A THE BROADWAY, NORTHGATE, CRAWLEY	More Than Likely	12 or 13	1	1	1	Had prior approval as of Sept 2015 but not commenced
124	CR/2013/0482/PA3	8 THE BROADWAY, NORTHGATE, CRAWLEY	More Than Likely	12 or 13	2	2	2	Had prior approval as of Sept 2015 but not commenced
125	CR/2013/0347/PA3	ST ANDREWS HOUSE, 26 BRIGHTON ROAD, SOUTHGATE, CRAWLEY	More Than Likely	39 or 44	6	6	6	Had prior approval as of Sept 2015 but not commenced

Appendix C Development Uncertainty Log - Employment

Reference No	Development Name	Location/Address	Status (See LMFR Table 3-1)	SATURN Zone No. (estimation by PBA)	Size (GFA Sqm)	Completed Size by 2021 (GFA or Employees)	Completed Size by 2030 (GFA or Employees)	Remarks/Comments if any (eg such as source of information)
1		Astral Towers/The White House, Betts Way (marketed as Nova)	Near Certain	111	11,362	292	778	Site is currently cleared and vacant with planning permission for erection of a new office building comprising 11,362 square metres of office floorspace.
2	Wickes Trade/DIY	Premiere House, Betts Way	More Than Likely	111	9558 (2481)	171	455	Site is cleared and vacant. The site had benefited from planning permission CR/2008/0022/FUL for erection of 9,558 square metres of office floorspace. This permission has since expired, with application CR/2011/0335/FUL (seeking renewal) disposed of with no decision issued. Council would wish to see business use come forward, though site is being promoted by land owner for retail. Retail proposal anticipated to provide around 40 jobs. However, given business aspirations for site, job figures presented here are based on assumption that site provides 9,558 square metres office space as originally permitted. (Retail application details in brackets)
3	Acorn Retail Park (Smyth's Toy, M&S Simply Food, Aldi)	Former County Oak Business Centre, Betts Way*	Near Certain	111	3,005	45	120	Site is cleared, with development having commenced to implement a 3,997 sqm food store. Planning permission CR/2014/0824/FUL permits three retail units, comprising two food stores and a comparison toy store. Scheme would deliver a total floor area of 4,920 sqm, including a net retail sales area of 3,005 sqm
4		Manor Royal Opportunity Area, Welland Medical Site*	Near Certain	113	8,782	90	240	The site is identified by the Core Strategy (2008) as an opportunity area for employment. Planning Permission CR/2013/0620/FUL grants the erection of a Class B1C production building and ancillary offices to provide 2,077 sqm B1a floor space, 6,705 sqm B1c floor space, and 485 sqm plant (as per supporting planning statement).
5		Former GSK Site, Phase One (CR/2013/0255/FUL)	Near Certain	48-49	25,317	68	180	The site is cleared with planning permission for 2 x B8 data storage buildings, associated external plant, HV sub-station, future siting of prefabricated data storage building and associated plant. Development has commenced, and is well progressed.
6		Former GSK Site, Phase Two (CR/2014/0415/ARM)	Near Certain	48	35,776	0	0	The site is cleared with planning permission (Reserved Matters) for design, appearance and layout of 4 buildings to include 2 data storage halls, 1 business hub building, comprising café at ground floor with offices above and an emergency power building together with associated car parking, servicing arrangements and landscaping. Building 1 provides 13,431 sqm B8. Building 2 provides approx 1521 sqm B1a and 19391 sqm B8. Building 3 provides 2696 sqm plant. Building 4 provides approximately 1433 sqm B1a and 87 sqm cafe.
7		SECAMB, Faraday Road, Manor Royal	Near Certain	115	2,661	65	174	The site is cleared and vacant, with planning permission (CR/2014/0102/FUL) for a new Ambulance Make Ready Centre (MRC) and Hazardous Area Response Team Unit (HART). Provides 2,661 sqm Sui Generis floorspace.

Reference No	Development Name	Location/Address	Status (See LMFR Table 3-1)	SATURN Zone No. (estimation by PBA)	Size (GFA Sqm)	Completed Size by 2021 (GFA or Employees)	Completed Size by 2030 (GFA or Employees)	Remarks/Comments if any (eg such as source of information)
8		Former BOC Edwards site, Manor Royal	Near Certain	115-117	4,051	44	117	The site is cleared and vacant. CR/2014/0437/FUL grants permission for construction of new car showroom, vehicle servicing workshops and smart repair workshop, all with associated storage, delivery & administration facilities, car parking and landscaping. Provides two buildings, totalling 4,051 sqm Sui Generis floorspace and 1,467 B1(c) floorspace. Trajectory assumes 26.5% of site area (2.62ha) is included to reflect the proportion of B1c floorspace of total planning permission.
9		Former BOC Edwards site (Residual Land)	Hypothetical	115-117	4,800	101	268	Design & Access Statement submitted alongside Planning Application CR/2014/0437/FUL sets out that land does not form part of the application, and will be used for vehicle parking short-term until a suitable development proposal or sale is agreed. Current intention is that the land will be used for B1, B2, or B8 use. Consent CR/2014/0615/FUL grants temporary consent for a 3-year period for airport related car parking. Assumes 100% of site area (1.2ha) is included in trajectory at a plot ratio of 0.4%, with the site occupied by 50% offices and 50% .
10		Thales, Gatwick Road	Near Certain	116	17,016	584	1558	Hybrid application approved subject to legal agreement. Full application for Parcel 2; 1 x 4 storey, 6,720 sq.m B1(a) building (including 3,544 sqm Sui Generis). Outline application for Parcel 1 (2 x B1(a) buildings totalling 13,840sq.m) and Parcel 3 (3 x A1 and A3/A5 buildings totalling 1,025 sq.m). Assumes 78.8% of site area (4.1ha) is included in trajectory (after taking into account non B class uses)
11		Segro West, Manor Royal	Near Certain	117	16,173	367	979	Site is cleared and vacant. Planning permission, subject to legal agreement, for erection of two office buildings, a four and a half storey decked car park, a single storey decked car park and surface car parking with landscaping and new access from private roads linking to Fleming Way and London Road.
12		E2 Crawley Business Quarter	Near Certain	113-117	11,525	309	823	Site is cleared and vacant, with planning permission for erection of a four-storey office building. Development has commenced and is well progressed. Virgin Atlantic has agreed to let building when complete.
13		Former Pasta Reale Site, Fleming Way	Hypothetical	113	4,800	101	268	Pasta Reale is in administration, with administrator exploring options for the site. Site anticipated to become available. Assumes 0.4% plot ratio, with 50% of site becoming available for offices, and 50% for industrial.
14		Harwoods Jaguar and Land Rover, Crawley	Hypothetical	48	1,920	40	107	Site is situated at the heart of Manor Royal. Site is currently occupied, but dealership seeking to relocate, and site is anticipated to become available in Years 0-5. Assumes 0.4% plot ratio, with 50% of site becoming available for offices, and 50% for industrial.
15	Ocado	Former City Link Depot, Whitworth Road	Near Certain	111	N/A	56	150	Permission for alterations to enable use of the former City Link depot by Ocado, no additional floorspace.
16		Wingspan Club Residual Land	Hypothetical		2,560	57	152	Crawley Borough Council owned parcel of land adjacent to the former Wingspan Club, off County Oak Way.

Reference No	Development Name	Location/Address	Status (See LMFR Table 3-1)	SATURN Zone No. (estimation by PBA)	Size (GFA Sqm)	Completed Size by 2021 (GFA or Employees)	Completed Size by 2030 (GFA or Employees)	Remarks/Comments if any (eg such as source of information)
17		Southways (Planning Permission)	More Than Likely	111	3,241	116	308	Site falls within land identified for Gatwick Safeguarding. Certificate of Lawfulness CR/2013/0008/192 permits the erection of twin office buildings and confirm that development has been implemented and is extant. Landowner has confirmed the intention to implement the office permission once the issue of the second runway is resolved, with current airport parking only representing a temporary use. The land owner has advised that the land can be delivered in Years 2-5. CR/2013/0094/FUL permits temporary change of use to airport parking. Initial application does not provide detail of jobs created, and this job forecast assumes 100% of floorspace is used for offices in order to identify figures.
18		Tilgate Forest Business Centre Vacant Plots	Near Certain	71/74	4,630	165	441	Site comprises vacant plots within the existing Tilgate Forest Business Centre, which have planning permission for office development (2 blocks, three storeys, total of 4,630 sqm). Permission renewed through CR/2013/0423/FUL. Application does not provide detail of jobs created, and this job forecast therefore assume 100% offices.
19		Forge Wood (North East Sector) Employment Land	Near Certain	120-122	5,000	123	329	Vacant greenfield land being brought forward as part of new Forge Wood neighbourhood to deliver 5,000 sqm business land. Planning Permission granted to be implemented 2014, with conditions being discharged. Assumes 50% offices, 50% industrial. It is not considered that the retail job assumption can be readily applied to the neighbourhood centre, as Town Centre retail job creation is more intensive. Therefore an assumption of 50 additional jobs is assumed to account for job growth from neighbourhood centre retail provision.
20		Sutherland House	Reasonably Foreseeable	58	6,560	190	507	Part Vacant Office. Active Interest in site. Local Plan identifies site for employment use, though allows flexibility for residential. Given employment aspirations for site and for consistency with the ELT, it is assumed that development will comprise 75% office and 25% industrial, at a plot ratio of 0.4%
21		Land at Russell Way	More Than Likely	58	3,600	104	278	Site comprises a partly cleared land parcel and part vacant office. Active interest. Local Plan identifies site for employment use, though allows flexibility for residential. Given employment aspirations for site and for consistency with the ELT, it is assumed that development will comprise 75% office and 25% residential. Given the more central location, the urban/town centre plot ratio of 0.4% is applied.
22		Land at Jersey Farm	Near Certain	47	1,128	8	21	Application to develop 3 x B1c/B8 industrial units on greenfield land outside the built up area boundary, adjoining Manor Royal.
23		Parkside Car Park	Reasonably Foreseeable		0	6	17	Site is currently being considered by CBC for housing. Development would likely comprise ground floor retail with upper floor residential use. Given Town Centre location, a plot density of 0.5 is assumed, with 50% of the site dedicated to flexible A-class use and residential use respectively.

Reference No	Development Name	Location/Address	Status (See LMFR Table 3-1)	SATURN Zone No. (estimation by PBA)	Size (GFA Sqm)	Completed Size by 2021 (GFA or Employees)	Completed Size by 2030 (GFA or Employees)	Remarks/Comments if any (eg such as source of information)
24		Traders Market, High Street	Near Certain	10/29/11	0	7	18	Site has permission for mixed use development comprising 6 retail units at ground floor level, with two x 1-bed and three x 2-bed apartments above. Although permission relates to A1 units, it is recognised that the scope of units may change within the A Classes, and the average assumption of A1/A2/A3 uses (1 job per 17.6 sqm) is applied.
25		Central Sussex College (East of Tower)	Reasonably Foreseeable	5	0	0	0	Site has been purchased and residential development of up to 70 units is being considered. Council may encourage applicants to liaise with County Buildings site owner to explore opportunities for related mixed use residential/employment across both sites. Likely to come forward as 100% residential.
26		Brittingham House, Orchard Street	Reasonably Foreseeable	29 or 10	1,300	47	124	Site is identified within Local Plan, and given its town centre location, represents an opportunity for ground floor office development with upper floor residential. Jobs figure has been identified on the basis of a 2.0 plot ratio, with a 50% floorspace dedicated to housing and 50% to office.
27		County Buildings	More Than Likely	8 or 9	5,020	179	478	WSCC keen to develop site with residential, and possible that an application for up to 270 residential units will be submitted by December 2015. CBC may seek to encourage college and county sites to work together, and identify what mixed uses might be encouraged. Given the likely residential focus, it is assumed that 75% of the developable area (plot ratio 2.0) is dedicated to housing, with 25% dedicated to B1 office use.
28		Telford Place	More Than Likely	15 or 50?	800	29	76	Site has been purchased by council, and is intended to be prioritised as a housing site for up to 180 units. The potential for ground floor business use as part of a mixed use development is also being explored, and between 650 and 900 sqm office space may be deliverable. This is consistent with the level of floorspace identified in the expired CR/2011/0114/FUL which permitted 312 residential units and 872 sqm retail, but was not built out. Therefore, no assumption is made for plot ratio, and the 800 square metres figure is used as the basis for job calculation.
29		Crawley Station and Car Parks	Near Certain	21 or 22	5,084	N/A	N/A	Residential development and station improvements. No job information provided.
30		Land North of The Boulevard	Reasonably Foreseeable		11,400	456	1215	Total site area is 2.98 hectares, though site includes Woodhall Duckham House (0.7 hectares) which has Prior Approval for 173 flats, with a planning application submitted to increase this to 185 dwellings. For the purposes of identifying job figures, Woodhall Duckham House is therefore removed from site considerations, leaving a remaining available site area of 2.28 hectares. Of this, it is assumed that 50% of the site area (1.14 hectares) will come forward for residential use. It is assumed that the remainder of the site (1.14 hectares) will be divided equally between office (0.57 hectares) and flexible A-Class use (0.57 hectares). A plot ratio of 2.0 is assumed for the office space, and 0.4 for the retail.





Appendix D Do Minimum Highway Infrastructure Schemes

Project/Scheme Description	SATURN Coding/PBA Comment	2021	2030
Integrated Works Programme Schemes			
Puffin Crossing Proposal-1. Overview. Turners Hill Road, Crawley (Just west of Turners Hill/Church Road Junction to east of Turners Hill Road/Ashurst Drive Junction)-to be implemented by 2017	NOT CODED - Puffin crossings are not coded in base model	N/A	N/A
Woodfield Road - Detailed Design Traffic Signs and Road Markings-to be implemented by 2017	NOT CODED - Already 30MPH	N/A	N/A
Billinton Drive -Detailed Design General Arrangement - to be implemented by 2017	NOT CODED - Changes in traffic calming arrangements (replacement of give way with tables	N/A	N/A
Crawley Local Plan Mitigation Schemes			
<i>Crawley Borough Council Local Plan Transport Strategy: LPTS Stage 2 Report Revision, 3 August 2014- Reference Case Network Scenario-see Table12 pp46 pdf/pp40 doc numbering; Figures 12 to 16 (Six Listed schemes in Table 12 to include)</i>			
A2011 Crawley Avenue / A2004 Northgate Avenue / Hazelwick Avenue - Signalised Roundabout and widening of circulating carriageway	Node 1682 - Priority to signals and add new link. Increase lanes on circulatory from 3 to 4 and increase sat flow	Y	Y
A2220 Station Way / A2004 Southgate Avenue - Correct modelled signal arrangement	Node 1020 changed lane usage form south arm	Y	Y
A23 Crawley Avenue / Ifield Avenue - New linked signal junction scheme	Node 9077 changed from roundabout to signals	Y	Y

A23 London Road / Manor Royal - Improve capacity of 2-lane northbound right turn from A32	Node 1832 increase stacking capacity and increase sat flow for right turn from node 1833	Y	Y
A2011 Crawley Avenue / B2036 Balcombe Road - Widen A2011 westbound to provide 2 lanes and 2 right turns lanes at the signals	INCLUDED IN NES SCHEME BELOW	N/A	N/A
M23 Junction 9 Gatwick Airport - widen offside junction approaches from M23	Node 1609 increase northbound approach to 3 lanes	Y	Y
Consented Development-Developer Funded Section 106 and Section 278 Schemes			
Crawley North East Sector (NES) Sector Schemes, "Forge Wood"			
Steers Lane, signal controlled development access			
Radford Road / Steers lane, traffic signals junction	Already in model	N/A	N/A
Balcombe Road / Steers lane, traffic signals junction	Node 1694 change from priority to signals	Y	Y
Crawley Avenue to Balcombe Road Link Road, with traffic signals junctions at each end and at intermediate development access	Delete link 1682 to 1683. Make 1683 to 1681 2-way. Signalise 1683. Remove right turn ban from 1683 to 1681	Y	Y
Balcombe Rd development access junctions			
M23 junction 10 improvement (widening of approaches from slips to circulating carriageway)	Changes to lanes at nodes 1601, 1604, 1606, 1609	Y	Y
Hazelwick junction improvement: partial signalisation	Not required	N/A	N/A
Radford Road bridge over Brighton Main Line – signals on narrow section of bridge to allow for cycleway provision.	Node 14002 coded as shuttle signals	Y	Y

New bus service package developed – details to be supplied	Not included at this stage	Y	Y
Amendment to implemented Steers Lane / Balcombe Road signals to re-instate right turn from Balcombe Rd into Steers Lane	Node 1694 re-coded with signals as not in base	Y	Y
Balcombe Road / Antlands Lane, modifications to existing roundabout	Node 9058 coded with two lanes from north and south	Y	Y
Radford Road approach to Gatwick Road	Node 1800 increase sat flow from node 14002	Y	Y
Kilnwood Vale (land west of Bewbush)			
Main site access already exists	No change required		
Secondary site access is currently used for construction traffic, will have traffic signals added for use by development access traffic	New node 80162 (coded from streetview)	Y	Y

Project/Scheme Description	SATURN Coding/PBA Comment	2021	2030
Intergrated Works Programme Schemes			
Puffin Crossing Proposal-1. Overview. Turners Hill Road, Crawley (Just west of Turners Hill/Church Road Junction to east of Turners Hill Road/Ashurst Drive Junction)-to be implemented by 2017	NOT CODED - Puffin crossings are not coded in base model	N/A	N/A
Woodfield Road - Detailed Design Traffic Signs and Road Markings-to be implemented by 2017	NOT CODED - Already 30MPH	N/A	N/A
Billinton Drive -Detailed Design General Arrangement - to be implemented by 2017	NOT CODED - Changes in traffic calming arrangements (replacement of give way with tables)	N/A	N/A
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A23 Crawley Avenue / Ifield Avenue - New linked signal junction scheme	Node 9077 changed from rbt to signals	Y	Y
A23 London Road / Manor Royal - Improve capacity of 2-lane northbound right turn from A32	Node 1832 increase stacking capacity and increase sat flow for right turn from node 1833	Y	Y
A2011 Crawley Avenue / B2036 Balcombe Road - Widen A2011 westbound to provide 2 lanes and 2 right turns lanes at the signals	INCLUDED IN NES SCHEME BELOW	N/A	N/A
M23 Junction 9 Gatwick Airport - widen offside junction approaches from M23	Node 1609 increase northbound approach to 3 lanes	Y	Y
Consented Development- Developer Funded Section 106 and Section 278 Schemes			
Crawley North East Sector (NES) Sector Schemes, "Forge Wood"			
Steers Lane, signal controlled devt access			
Radford Road / Steers lane, traffic signals junction	Already in model	N/A	N/A
Balcombe Road / Steers lane, traffic signals junction	Node 1694 change from priority to signals	Y	Y
Crawley Avenue to Balcombe Road link Road, with traffic signals junctions at each end and at intermediate devt access	Delete link 1682 to 1683. Make 1683 to 1681 2-way. Signalise 1683. Remove right turn ban from 1683 to 1681	Y	Y
Balcombe Rd devt access junctions			
M23 junction 10 improvement (widening of approaches from slips to circulating carriageway)	Changes to lanes at nodes 1601, 1604, 1606, 1609	Y	Y
Hazlewick junction improvement: partial signalisation	Not required	N/A	N/A
Radford Road bridge over Brighton Main Line – signals on narrow section of bridge to allow for cycleway provision.	Node 14002 coded as shuttle signals	Y	Y
New bus service package developed – details to be supplied	Not included at this stage	Y	Y
Amendment to implemented Steers Lane / Balcombe Road signals to re-instate right turn from Balcombe Rd into Steers Lane	Node 1694 recoded with signals as not in base	Y	Y
Balcombe Road / Antlands Lane, modifications to existing roundabout	Node 9058 coded with two lanes from north and south	Y	Y
Radford Road approach to Gatwick Road	Node 1800 increase sat flow from node 14002	Y	Y
Kilwood Vale (land west of Bewbush)			
Main site access already exists	No change required		
Secondary site access is currently used for construction traffic, will have traffic signals added for use by development access traffic	New node 80162 (coded from streetview)	Y	Y
Reduction in speed limit on part of A264 Crawley Road / A2220 Horsham Road from main site access towards Crawley from national speed limit to 50mph	Links 7020-80162-1880 reduced to 80kph	Y	Y
A23 Crawley Ave / A2220 Horsham Rd "Cheals" junction phase 1 scheme widening Horsham Rd eastbound approach	Node 1640 two lanes coded from node 80140	Y	Y
Cheals junction phase 2 scheme after 2100 units on Kilwood Vale delivered, contribution of £1.2M to signalised crossroads, but funding gap to complete scheme	Node 1640 changed to signals Link 80140 to 80141 deleted	N	Y
Former Thales Site On Gatwick Road			
SECAM HQ with 3 junction improvements, so far in sketch form			
Gatwick Rd / Manor Royal	Node 1840 - northern arm changed to 4 lane approach	Y	Y
Gatwick Rd / Fleming Way	Node 18271 - southern arm increased to 3 lanes.		
	Node 1826 north arm increased to two vehicle lanes (+bus lane) and western arm increased to 3 lanes Node 18291 southern arm increased to 3 lanes	Y	Y
Gatwick Rd / Beehive Ring Road	Node 11151 north arm lane 1 straight ahead movement allowed	Y	Y
Telford Place 200 Units			
Junction of A2004 Southgate Avenue / Telford Place to close	Node 8140 deleted.	Y	Y
Replaced by new link road from Telford Place to A2220 Haslett Avenue East where Crawley Library Access is	Node 1026 changed to dummy node	Y	Y

